



FRIDAY, NOVEMBER 30.

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Contributions.

Affairs in Chili.

A correspondent writes us from Chili, concerning the contract of the North & South American Construction Co., as follows:

"It is quite likely the news of this business may make many persons wish to come to Chili, and I must urge you to state clearly in your paper that it will be sheer folly to do so, unless under contract. This country is full of people looking for situations as clerks, salesmen, etc., while the state and private railroads, generally well supplied (and more and more) from native sources, always, when needed, apply to their agents for all foreign officials, drivers, mechanics, etc. A short time since a lot of English drivers, firemen, fitters, and others, came out looking for and counting upon speedy occupation. A few only succeeded; the rest returned home. I certainly would be glad to see a large number of thoroughly trained, sober and intelligent countrymen in good positions here, but the only way, without meeting distress, disappointment and, quite possibly, misery, is for such as wish it to secure suitable contracts at home, and never, for a moment, think of coming to Chili to look for situations and work.

"It may interest you to know that I saw, a few days since, a contract for two thousand tons steel rails, to be delivered by steamer f.o.b. Valparaiso in January next for five pounds eleven shillings per long ton."

An American Superintendent in England.

RICHMOND, Va., Nov. 25, 1888.

TO THE EDITOR OF THE RAILROAD GAZETTE:

Permit me to thank you for your editorial remarks upon a letter over the signature of W. H. Booth, which appeared in a recent issue of the *Gazette*. I confess that I was somewhat dismayed when I saw in print extracts from that which was written *currente calamo* to a friend, with no anticipation of its publication. It was intended, as a careful reader might have inferred, neither as a disquisition nor a comprehensive account of things on the other side of the Atlantic. I spoke of what I had seen, not of that which I did not see, and I am chided with scant courtesy for the latter, as well as for inaccuracy in the former. It is consoling, therefore, to receive some assurance that I am not the only sinner against Mr. Booth's sense of propriety.

E. T. D. MYERS.

Traffic Associations and Rates.

NOV. 19, 1888.

TO THE EDITOR OF THE RAILROAD GAZETTE:

It seems to be admitted that the only solution of the interminable and destructive quarrels for competitive business between railroads, lies either in pooling or the allowance of differential rates. There is little likelihood of Congress receding from the prohibition of pools as set forth in the Interstate Commerce Act, and the use of differential rates is of little effect so long as independent action is maintained by traffic managers or other railroad officials.

The present associations should be so constituted as to maintain rates and permit each participating company to handle an equitable part of the traffic. To this end the traffic or other managers of the lines should be authorized and directed to agree on fair and reasonable rates on competitive business, but all authority should be withdrawn from them to alter either by increase or reduction except by unanimous action. The commissioner should be authorized and empowered to put in force such differentials as in his judgment become from time to time necessary, with power to withdraw or alter the same, but this authority should be vested in him alone.

A board of arbitration might be advisable to decide such questions as could be lawfully brought before it. In fact such a national board corresponding to the Interstate Commerce Commission might be of great value to the railroad interest.

It may be objected that the companies would be unwilling to place so much power in the hands of any one man. This is possible, but it must be remembered that the commissioners of the different associations are quite as capable of deciding the issues involved as any of the parties interested,

and being disinterested, would be much more likely to act fairly toward all interests.

One thing is certain, the situation could not be worse than it is at present. The officials of the different companies have demonstrated their inability to protect the enormous interests committed to their charge.

PEACE.

Deflectors and Smoke-Boxes.

PITTSBURGH, Pa., Sept. 29, 1888.

TO THE EDITOR OF THE RAILROAD GAZETTE:

The diagrams in your last issue, referring to smoke-box deflectors, are clearly supplemental to your remarks in connection with my communication on this subject in the *Gazette* of Sept. 14, to which I defer reply for the purpose of obtaining fuller data as to the use in ordinary smoke-boxes which I mentioned.

No objection can, of course, be taken to these diagrams, if presented merely as exemplifying your theory of the question under discussion, but as even approximate representations of standard or prevailing constructions they appear so far inaccurate as to wholly misstate the premises, as they imply that the deflector shown in the upper figure, which is substantially that which is practicable in an ordinary smoke-box, is to be compared with the very peculiar and unusual form shown in the lower figure, the employment of which would undoubtedly necessitate an extension as long, or nearly so, as that shown.

I do not think it will be seriously disputed that the deflector shown in the upper figure accords, as fully as can be in so crude a diagram, with that which is used in connection with almost all the extended smoke-box constructions now in service. This will be seen by reference to the design suggested as desirable, and giving the best results, by the committee of the Master Mechanics' Association (Report, 1888, fig. 5, p. 52), or to the several instances in the new edition of "Recent Locomotives." The consolidation engine of the Norfolk & Western, illustrated in that work, has substantially such a deflector; and although that used in the subsequent and similar engine, Class R, of the Pennsylvania Railroad is not shown, it is a well-known fact that the same deflector is used by the latter road, and hence, it goes without saying, that it has been adopted by most of the other roads who, as a rule, follow, in such matters, the practice of the Pennsylvania Railroad.

On the other hand, the deflector of the lower figure is of an exceptional construction, of which only a few isolated cases, if any, can be cited, and does not exemplify either the ruling or the essential practice with extended smoke-boxes. That it is possible to so construct and locate a deflector as to necessitate an extended smoke-box, is self evident, but the supposed advantage of such variation from the usual practice is not apparent.

The comparison, to be a fair one, should be between a deflector substantially like that shown in the upper figure (or its equivalent in the ordinary constructions, as above indicated) when used in a smoke-box of normal dimensions, which would be somewhat longer than that shown in the upper figure, and when used in an extended smoke-box, so called, by which is meant one having an extension of, say, 30 in. or more. Under these conditions an exit for the smoke and gases, equal to that shown in your lower figure, would be provided in an ordinary smoke-box. The concentration of the draft upon, or, rather, increase of draft through the lower flues, which is incidental to the deflector, and is induced in the standard extended smoke-box constructions in which it is employed, is wholly independent of the length of the smoke-box.

As to the supposed objection by reason of the closeness of the deflector to the flue sheet, I note that in a number of large ten-wheel engines recently constructed for and now in service on the Atchison, Topeka & Santa Fe, having 60-in. boilers and 19-in. cylinders, the distance of the deflector from the flue sheet at top is 8 in., the radius of curvature being 6 in., and at bottom 12½ in., the bottom of the plate being 12 in. above the bottom of smoke-box. The smoke-box is 35 in. long, which, in the writer's view, would be ample without an extension, but a 28-in. extension is added. The performance of these engines is reported as entirely satisfactory.

J. SNOWDEN BELL.

[This letter was received in due time, but its publication has been delayed by oversight.—EDITOR RAILROAD GAZETTE.]

Train Accidents in October.

COLLISIONS.

REAR.

3d, on Chicago & Atlantic, at Kankakee, Ind., a construction train which had stopped at a water tank was run into by a fast freight train, doing considerable damage. Three laborers seriously injured.

3d, on New York Central & Hudson River, at Savannah, N. Y., freight train ran into the rear of a construction train, damaging engine and derailing several cars. Several laborers seriously and one fatally injured.

4th, on New York Central & Hudson River, near Jordan, N. Y., a light engine ran into the rear of a construction train, doing some damage and injuring several laborers.

4th, on joint track, at Pataskala, O., a Pittsburgh, Cincinnati & St. Louis freight train ran into the rear of a Baltimore & Ohio freight, which had stopped at a water tank, damaging engine and one car. One trainman injured.

4th, on Louisville & Nashville, at Adger's Station, Ala., freight train ran into a preceding freight. Engine and caboose wrecked.

5th, on St. Louis, Alton & Terre Haute, near Belleville, Ill., freight train ran into a preceding freight, damaging engine and 10 cars. One trainman and 2 men in charge of horses killed.

5th, on Pittsburgh, Fort Wayne & Chicago, near Wooster, O., freight train broke in two in descending a grade, and the rear portion ran into the forward one, damaging 12 cars.

7th, on Pennsylvania road, at Wall, Pa., a fast express train ran into a passenger train standing on the main track, damaging an engine and several cars. Engineer and 3 passengers injured.

9th, on New York, Lake Erie and Western, at Franklin, N. J., extra freight ran into the rear of local freight standing at the station. Some oil cars in one of the trains took fire and the wreck was burned up.

9th, on Pittsburgh, Cincinnati & St. Louis, near Amboy, Ind., engine of a heavy freight train was detached at the top of a grade for the purpose of running to a water tank. The train was not controlled and ran down the grade into the stopped engine, doing considerable damage. Fireman seriously injured.

10th, 8 p. m., on Lehigh Valley, at Mud Run, Pa., a long excursion train which had been stopped, with its rear end 170 ft. beyond the station, to wait for the expiration of the 10-minute interval between itself and the previous train, was run into at the rear by a following excursion train drawn by two heavy engines. The foremost engine crashed through the rear car for nearly half its length and crushed the two rear cars together. The damage to the engine immediately liberated a large quantity of steam, and 63 persons were killed and 23 or more injured, most of the victims being scalded to death. Three employees were injured by jumping from the engines. The brakeman of the standing train went back only 180 ft., and there was a white station signal which gave an indication contrary to the red light carried by him. The men on the approaching engines were not prompt to obey the danger signal when they saw it, and their speed was much higher than allowed by the rules under which they were running. A full account of this accident was published in the *Railroad Gazette*, of Oct. 19.

10th, on Denver, Texas & Fort Worth, near Vernon, Tex., freight train ran into a preceding freight which had stopped to cool a hot box, wrecking engine, caboose and several cars and killing a number of cattle. One trainman killed and 3 trainmen and 4 drovers riding in the caboose injured. A flag was sent back, but, owing to a dense fog, was not observed.

13th, on Pennsylvania road, near Columbia, Pa., passenger train ran into the rear of a freight train, wrecking engine, caboose and 5 cars.

13th, on Beech Creek Road, near Beech Creek, Pa., passenger train ran into some freight cars standing on the main track, killing the fireman and a tramp stealing a ride.

14th, on Baltimore & Ohio, near Union Mills, Ind., fast freight train ran into the rear of a milk train, wrecking engine, caboose and several cars. Four persons riding in the caboose injured, 2 of them fatally.

14th, on Northern Pacific, near Fallon, Mont., passenger train ran into the rear of a freight train, doing considerable damage. Three passengers injured.

15th, on Central Pacific, at Pinole, Cal., freight train ran into a preceding freight, wrecking an engine and several cars.

15th, on New York, New Haven & Hartford, at Manitic, Ct., passenger train ran into some freight cars which had been run on to the main track from a siding, probably by mischievous boys. Engine and several cars wrecked.

15th, on New York, Lake Erie & Western, at Newburgh, N. Y., a locomotive standing at a roundhouse unattended started suddenly and ran out upon the main track, where it collided with an engine and caboose. Both locomotives badly damaged.

17th, on Chicago, Burlington & Quincy, at Riverton, Ia., freight train ran into a preceding freight, demolishing a caboose and 8 cars, and causing the colliding engine to explode its boiler.

18th, on Chicago, St. Paul & Kansas City, near Freeport, Ill., a freight train broke in two and the rear portion collided with a closely following freight, damaging engine, caboose and several cars. Three men riding in the caboose injured.

19th, on Chicago & Atlantic, near Enterprise, O., freight train ran into a preceding freight, wrecking several cars. The wreck caught fire and was partially consumed.

19th, on West Shore road, at Coeyman's Junction, N. Y., passenger train ran into a freight car standing on a siding which fouled the main track, damaging the engine considerably. There was a dense fog at the time.

21st, on Missouri Pacific, near Frankfort, Kan., passenger train ran into a freight standing on the main track, doing considerable damage. One trainman and 1 passenger injured.

22d, on Burlington & Missouri River, at Axtell, Neb., freight train ran into the rear of a preceding freight, the engine of which had run out of water. Locomotive and caboose badly wrecked. Two stockmen asleep in the latter were killed, and another hurt.

22d, on New York, Lake Erie & Western, at Suffern, N. Y., a freight train ran into a preceding freight, which had stopped to do some switching, doing slight damage.

23d, on New York & New England, at Terryville, Conn., freight train broke in two, and the rear section ran into the forward one, derailing and wrecking 1 car.

24th, on Boston & Maine, near Concord, N. H., freight train broke in two and rear section ran into forward one, doing slight damage. A brakeman was thrown from a box-car and seriously injured.

24th, on Fitchburg road, near Eagle Bridge, N. Y., passenger train ran into the rear of a freight train. The caboose was crushed by the engine, and many of the freight cars were derailed. Two trainmen injured.

24th, on New York, Lake Erie & Western, near Otisville, N. Y., freight train which had been stopped for the purpose of attending to a broken brake-beam was run into by a closely following freight, making a bad wreck. The caboose was completely wrecked by the locomotive. One trainman killed, 4 injured. The conductor was thrown from the cupola of the caboose out upon the adjoining main track, where he was run over and injured by another train as he lay insensible. A flagman was sent back, but it appears did not go far enough.

25th, on Old Colony, at East Foxboro, Mass., freight train which had stopped to do some switching was run into by a following freight, piling up the engine and 30 cars in a complete wreck. One trainman hurt by jumping.

26th, on Virginia Midland, near Springfield, Va., freight train ran into a preceding freight. Engine derailed and, together with several cars, slightly damaged.

27th, on Burlington & Missouri River, near Burchard, Neb., engine of freight train, which had been detached to take water, backed into its train at considerable speed, wrecking tender and 5 cars.

27th, on Pittsburgh, McKeesport & Youghiogheny, a freight train ran over a misplaced switch and into some box cars standing on a side track. Engine and 3 cars damaged.

28th, on New York Central & Hudson River, near Lyons, N. Y., passenger train ran into the rear of a freight train, damaging engine and several cars. Engineer injured by jumping. The accident is ascribed to the failure of the runner of the passenger to observe a signal.

29th, on Cincinnati Southern, at Jessamine, Ky., freight train ran into a preceding freight, derailing the engine and damaging several cars. Three trainmen hurt.

29th, on Cincinnati Southern, near Pulaski, Ky., freight train ran into a preceding freight, making a very bad wreck. Three trainmen killed and several injured.

30th, 2 a. m., on Cincinnati, Hamilton & Dayton, near

Sidney, O., an empty engine ran into the rear of a freight ascending a grade, wrecking two cars.

30th, on New York, Pennsylvania & Ohio, at Akron, O., a freight train broke in two and the rear section ran into the forward one, wrecking 6 cars.

30th, on Chicago, St. Paul & Kansas City, at Waverly, Ia., an engine in making a flying switch dashed into the rear of a passenger train. Locomotive disabled and 2 coaches damaged.

30th, on Northern Pacific, at Clatsop, Mont., freight train ran into a preceding freight, doing some damage. A tramp killed.

30th, on Northern Pacific, near Townsend, Mont., freight train ran into the rear of a preceding freight which had been stalled on a grade, doing considerable damage. A passenger riding in the caboose killed and 5 others injured.

BUTTING.

3d, on Chicago & Northwestern, near Dixon, Ill., butting collision between two freight trains. One trainman injured.

3d, on Lehigh Valley, near Packerton Junction, Pa., passenger train collided with a freight train standing on the main track, wrecking both engines and 3 freight cars, and damaging the platforms of several cars of the express train. One trainman and several passengers injured.

3d, in Rochester, N. Y., butting collision between New York Central & Hudson River and Western New York & Pennsylvania locomotives, owing to a misplaced switch, disabling both.

4th, on Boston & Albany, near Grafton, Mass., a freight train descending a grade broke in two. The engine put on steam to get out of the way of the rear portion, and by so doing dashed into another freight which had been backed off upon the main track to avoid a passenger train going in the opposite direction. Fourteen cars and two engines were wrecked, and both main tracks blocked several hours.

5th, on Rome, Watertown & Ogdensburg, near Hannibal, N. Y., butting collision between a passenger train and a special, consisting of engine and baggage car, wrecking both engines. One trainman killed, 2 injured. It is stated that the special disregarded orders.

5th, on Old Colony, at South Braintree Junction, Mass., butting collision between two freight trains. Six cars derailed and damaged.

6th, night, on Baltimore & Ohio, near Dickerson's Station, Md., butting collision between a fast passenger train and a freight train, demolishing both locomotives, the mail baggage, express and 3 freight cars. Three trainmen killed, 6 injured. An east-bound freight was waiting on a siding for the last of three west-bound passenger trains to pass. The trainmen fell asleep and awoke just as the second passenger train passed, and, assuming it to be the third, started along only to meet the express train in a cut on a curve, where it was running at high speed.

7th, on West Shore road, at Fairport, N. Y., butting collision between two freight trains, doing some damage.

8th, on Georgia Pacific, near Anniston, Ala., butting collision between two freights, disabling both engines and derailling 5 cars. It is said that the accident was caused by the watch of one of the conductors being 5 minutes slow.

8th, on Chicago Burlington & Quincy, at Red Oak, Ia., butting collision between two switching engines, disabling both.

11th, on Cleveland, Lorain & Wheeling, near Massillon, O., butting collision between a passenger and a coal train, wrecking both engines and several cars. Two trainmen and one passenger hurt. It is stated that the conductor of the freight was misled by consulting a time-table in his caboose which had just been superseded.

11th, on Kansas City, Fort Scott & Memphis, in Kansas City, Mo., butting collision between a freight train and a switching engine, damaging both locomotives. Two trainmen injured.

11th, on Baltimore & Potomac, at Landover, Md., butting collision between two freight trains, one of which was going on to a side track, wrecking both engines and several cars.

13th, on Northern Pacific, near Hope, Idaho, butting collision between a passenger train and a freight train, due to misapprehension of orders, wrecking both engines and several cars of each train. Two trainmen and a tramp killed.

14th, on Richmond & Danville, at Statesville, N. C., butting collision between freight trains, damaging both engines.

16th, on Lehigh Valley road, near Tamanend Switch, Pa., butting collision on a sharp curve between a fast freight train and a construction train. Both locomotives were demolished and a number of flat cars of the latter, together with the caboose, were piled up in a very bad wreck, in which 1 trainman and 9 laborers were killed and 3 trainmen and about 20 laborers injured. A heavy fog prevailed at the time. A coroner's jury rendered a verdict charging the flagman with gross negligence and censuring the engineer of the fast freight for running too fast and the engineer of the construction train for not carrying out orders issued. The fast freight belonged to the Pennsylvania road.

16th, on Fitchburg road, at Williamstown, Mass., butting collision between construction train and switching locomotive, doing some damage.

18th, on Cumberland Valley, near Shippensburg, Pa., butting collision between a passenger train and a freight train, killing a baggage-master. The coroner's jury say that the conductor and engineer of one of the trains "forgot, refused or neglected" to hold their train at Shippensburg.

20th, on Chicago, Burlington & Quincy, in Chicago, Ill., collision between two switching engines, damaging both and injuring 1 trainman.

22d, on Philadelphia & Reading, in Philadelphia, Pa., butting collision between two freight trains, wrecking both engines. One trainman hurt.

24th, on Norfolk & Western, near Christiansburg, Va., butting collision between two freight trains, doing considerable damage. An operator failed to deliver an order.

24th, on Old Colony, at Howland's, Mass., butting collision between two passenger trains, due to a misplaced switch, wrecking both engines and several cars. One trainman slightly hurt. The baggage-master who turned the switch said his error was in consequence of excitement caused by being shouted at.

24th, on Central Pacific, at Krug's Station, Cal., butting collision between two freight trains, wrecking both engines. Several trainmen slightly hurt.

25th, on Chicago & Alton, near San Jose, Ill., butting collision between an empty passenger train and a freight train, demolishing both engines and several cars in each train. One trainman killed and another badly hurt.

26th, on Northern Pacific, near Tacoma, Wash. Ter., butting collision between two freight trains, due to a misplaced switch, damaging both engines.

27th, on Chicago, Milwaukee & St. Paul, at Minnville, Mo., butting collision between two freights, making a very bad wreck.

29th, on Northern Pacific, at Arlee, Mont., butting collision in a deep cut between two engines which had been cut loose from a freight train for the purpose of running to a water tank, and a double header freight train, wrecking the engines and injuring 3 trainmen.

29th, on East Tennessee, Virginia & Georgia, near Shamrock, Tenn., butting collision between a passenger train and

a coal train. Two trainmen killed and several passengers injured.

30th, on Cincinnati Southern, near Chattanooga, Tenn., butting collision between two freight trains, doing considerable damage.

CROSSING AND MISCELLANEOUS.

1st, on Pennsylvania road, at East Newark, N. J., a west-bound passenger train crashed into an east-bound freight crossing the main passenger track, piling up the engine, 4 oil tanks and several box cars in a bad wreck, injuring 2 trainmen. One of the oil tanks burst, and the wreck was immediately enveloped in flames. A signal tower was also destroyed, the operator of which escaped with slight injury by leaping out of a window into the swamp, a distance of 40 ft. It is stated that the passenger train could not be controlled owing to the failure of the air-brakes.

3d, at the crossing at Washington Court House, O., an Ohio & Mississippi freight ran into a Cincinnati & Muskingum Valley switching freight. Engine and one car damaged.

6th, at the crossing in Tonawanda, N. Y., a New York Central & Hudson River passenger train was run into by a New York, Lake Erie & Western freight, derailling the tender and baggage car of the former. The signal was disregarded.

7th, on Chicago & Northwestern, near Carroll, Ia., passenger train struck a freight car projecting over the main track from a siding, disabling the engine. Engineer hurt.

10th, at the crossing at Earl, Ill., a Chicago, Burlington & Quincy passenger train ran into a Chicago & Northwestern freight, demolishing 4 cars and disabling the engine. It is said that the passenger train had made the customary crossing stop, but started before the freight had cleared the crossing.

10th, on Northern Pacific, near Hope, Idaho, collision between a freight train and a construction train, killing 2 trainmen.

15th, on Old Colony, in Canton, Mass., a passenger train ran over a misplaced switch and into the side of another passenger train, damaging 3 cars, one of which was driven some distance through the brick wall of an adjoining building.

16th, near Austell, Ga., an East Tennessee, Virginia & Georgia passenger train collided with a Georgia Pacific freight train, damaging both engines. The engineer of the freight, whose engine was overturned, was badly scalded by escaping steam.

19th, on Central of Georgia, in Macon, Ga., an empty passenger train was backed into a freight train switching across the main track and 3 coaches and 4 freight cars were thrown over an embankment and badly wrecked.

21st, at the crossing in Birmingham, Ala., a Louisville & Nashville accommodation train was run into by a Georgia Pacific switching freight, overturning a coach and injuring a passenger.

22d, on New York, Lake Erie & Western, at Suffern, N. Y., a freight train drawn by two engines ran into the side of a train of empty passenger cars which was being switched in the yard. Several cars were damaged. The freight belonged to the West Shore road, and was being run over this road to avoid a temporary break in the track.

DERAILMENTS.

DEFECTS OF ROAD.

21st, on Missouri Pacific, near Buncheon, Mo., passenger train thrown from the track by the spreading of the rails.

28th, on East Tennessee, Virginia & Georgia, near Macon, Ga., engine of passenger train thrown from the track by the spreading of the rails.

29th, on Montgomery & Eufaula, at Montgomery, Ala., engine and 4 cars of freight train thrown from the track by the spreading of the rails. Two trainmen injured.

31st, on Southern Pacific, in Los Angeles, Cal., freight train derailed by a defective switch.

31st, on Louisville & Nashville, in Birmingham, Ala., 2 cars of a freight train derailed by a broken frog, overturned and badly damaged.

DEFECTS OF EQUIPMENT.

1st, on Georgia Pacific, near Temple, Ga., caboose and 3 cars of a freight train approaching a trestle derailed by a broken truck. The cars were dragged across the trestle on the sleepers, when they left the line and rolled down an embankment, while the caboose was tipped off the structure, falling a distance of 20 ft. and all being badly wrecked. Three trainmen, a man in charge of stock and a tramp were injured.

4th, on Louisville & Nashville, near Brewton, Ala., a car in a freight train broke down and a portion of the train was ditched and badly damaged.

9th, on Chicago, Milwaukee & St. Paul, near Tulare, Dak., 12 cars of a freight train derailed and wrecked by the breaking of a journal. Conductor fatally injured.

13th, on Burlington & Missouri River, at Omaha, Neb., the engineer and fireman of a locomotive pushing a passenger car were driven from their post by the escape of steam into the cab from a broken pipe, and the car was pushed off the end of the track into an adjoining building. Two persons injured.

14th, on Baltimore & Ohio, at Foly's Switch, Pa., 14 cars of a freight derailed and wrecked by the breaking of a wheel. An oil tank car caught fire and the wreck was partially consumed.

18th, on Central of Georgia, near Geneva, Ga., 13 cars of a freight train thrown from the track by a broken axle and wrecked.

27th, on Southern Pacific, near Banning, Cal., car of freight train derailed by a broken axle and ditched.

NEGLECTANCE IN OPERATING.

2d, on New York, New Haven & Hartford, in New Haven, Conn., engine derailed at a switch, owing to a switchman's shirt sleeve having caught on the lever so as to interfere with his operations.

19th, on Baltimore & Ohio, at Washington, Pa., a fast passenger train ran over a misplaced switch and on to a curved side track, where it was derailed because the speed was too high for the curve. The engine and 2 cars were tipped off the trestle supporting the side track and completely wrecked. Engineer and fireman killed and 2 other trainmen and 21 passengers injured. The coroner's jury placed the responsibility upon the conductor of a shifting engine. He had ordered the switch set for the side track and then failed to see that it was reset. A new switchman, who acted under the conductor's orders, was condemned for gross negligence.

21st, on Elmira, Cortland & Northern, near Breesport, N. Y., passenger train derailed by a misplaced switch, the engine and one car being overturned in the ditch. Four trainmen and several passengers injured.

27th, on Northern Pacific, near Crow Wing, Minn., passenger train approaching a bridge over Crow Wing River derailed by a misplaced switch. The tender, mail and 2 baggage cars immediately plunged over an embankment into the river, but the engine broke away from the tender and crossed the bridge on the ties, when it also left the line and went over the embankment. Fireman killed, and several trainmen and a man riding on the front platform of the mail car injured.

28th, on Dayton & Michigan, near West Cairo, O., 23 cars

of a freight train derailed and badly wrecked by a steer falling out of the end door of a stock car.

30th, on Denver & Rio Grande, near Salina, Col., a train consisting of an engine and a pile-driver car in descending a steep grade got beyond control of the trainmen, and ran so fast that it was derailed at a sharp curve and went over an embankment. Two trainmen were killed and 2 seriously injured. The train was equipped with the air brake, but seems to have been carelessly handled.

UNFORESEEN OBSTRUCTIONS.

2d, on Missouri Pacific, in the Atchafalaya Swamp, La., freight train ran over a drove of horses on a trestle, and the engine and several cars were thrown into the ditch in a bad wreck. Engineer killed.

2d, on Southern Pacific, at Ripon, Cal., passenger train derailed by a purposely misplaced switch, overturning the engine and wrecking the baggage car. One trainman injured.

7th, on Ohio & Mississippi, near Washington, Ind., freight train ran over a cow; engine derailed and ditched.

27th, on Northern Pacific, near Eagle Gorge, Wash. Ter., a passenger train ran into a landslide and the engine and baggage car were derailed and went over an embankment in Green River. One trainman killed and another injured.

27th, on Newport News & Mississippi Valley, near Charleston, W. Va., passenger train derailed by a maliciously misplaced switch and thrown down an embankment. The wreck caught fire from the stove in the baggage car, and burned up. The fireman was pinned down between the baggage car and tender in the wreck, and the conductor, in trying to extricate him, was overtaken by the flames, and both were burned to death.

29th, on Columbus & Western, near Alexander City, Ala., construction train moving backward ran over a cow and 12 cars were derailed and badly wrecked. Two trainmen killed, 10 laborers injured.

UNEXPLAINED.

1st, on Wabash Western, near Mexico, Mo., passenger train derailed; 1 car overturned. Three passengers injured.

2d, on Duluth, South Shore & Atlantic, near Marquette, Mich., a car in an ore train approaching a bridge jumped the track, causing the structure to give away. Six cars fell through.

3d, on Pennsylvania, at Millstone, N. J., 7 cars of freight train derailed and wrecked, killing a number of cattle.

3d, on New York Central & Hudson River, at Byron, N. Y., all but the engine of a passenger train derailed by the tender jumping the track at a frog. The smoking car was overturned down a 10 ft. embankment and the rear sleepers came to a stop in an adjacent field. The couplings broke at three different places, the ends of the cars being badly damaged. Two passengers slightly injured.

5th, on Southern Pacific, near Santa Cruz, Cal., passenger train derailed on a trestle.

5th, on Baltimore & Ohio, near Cornwallis, W. Va., freight train derailed and wrecked. Engineer killed.

7th, on New York, Lake Erie & Western, at Ardon, N. Y., engine of freight train derailed at a switch.

7th, on Louisville & Nashville, at New Castle, Ala., passenger train derailed.

11th, on Central of Georgia, at Laurens, S. C., freight train derailed, the tender and 2 cars going over an embankment.

12th, on Boston & Albany, at South Framingham, Mass., freight train derailed.

12th, on Boston & Albany, at South Framingham, Mass., another freight train derailed.

15th, on Louisville, New Orleans & Texas, at Burk's, Tenn., freight train derailed, wrecking 14 cars. One trainman killed.

15th, on Northwest & Florida, near Montgomery, Ala., passenger train derailed.

16th, on Philadelphia & Reading, near Hamburg, Pa., freight train derailed, a portion of the train being thrown over an embankment in a bad wreck.

17th, on New York Central & Hudson River, at Grand Central Station, New York City, a car of a passenger train entering the station was derailed at a switch.

18th, on Philadelphia & Reading, near Leedsport, Pa., coal train derailed and wrecked. One trainman killed.

19th, on Chicago & Northwestern, near Geneva, Ill., as an express and a freight train were passing on adjoining tracks a car of the latter was derailed and thrown against the passenger train, badly damaging the locomotive and two forward cars. Four trainmen injured.

19th, on Central of Georgia, near Americus, Ga., several cars of freight train derailed and damaged.

21st, on Union Pacific, near Holmesville, Neb., several cars of a freight train derailed and wrecked.

22d, on Atlantic & Pacific, near Belmont, Ariz., caboose and several cars of a freight train derailed and overturned, injuring 3 passengers.

22d, on Atlantic & Pacific, near Belmont, Ariz., freight train derailed.

23d, on Atlantic & Pacific, at Belmont, Ariz., freight train derailed.

23d, on Norfolk & Western, at Clinch Valley Junction, Va., engine and 3 cars of a freight train derailed. A house adjacent to the track was demolished and set on fire.

23d, on Pennsylvania, near Tyrone, Pa., freight train derailed and badly wrecked. Two boys stealing a ride killed.

24th, on Burlington & Missouri River, at Clark's, Neb., engine and several cars of freight train derailed and wrecked.

24th, on Central Pacific, at Port Costa, Cal., passenger train leaving a transfer boat was derailed, damaging several cars. Three passengers injured.

25th, on Kentucky Central, near Richmond, Ky., passenger train derailed, injuring 3 trainmen and a passenger.

25th, on Kentucky Central, near Paris, Ky., passenger train derailed. Two trainmen and several passengers hurt.

25th, on Nashville, Chattanooga & St. Louis, near Hollow Rock, Tenn., 2 cars of a freight train derailed.

25th, on New York, New Haven & Hartford, near Bridgeport, Conn., freight train derailed.

26th, on Columbus & Western, at Startevant, Ga., engine and several cars of freight train derailed.

30th, on Brunswick & Western, at Acree, Ga., 9 cars of a freight train derailed.

31st, on Hartford & Connecticut Western, at Canton, Ct., several cars in a mixed train derailed.

31st, on West Jersey, near Clarksboro, N. J., 5 cars of an excursion train derailed, 3 of them being overturned, slightly injuring several passengers.

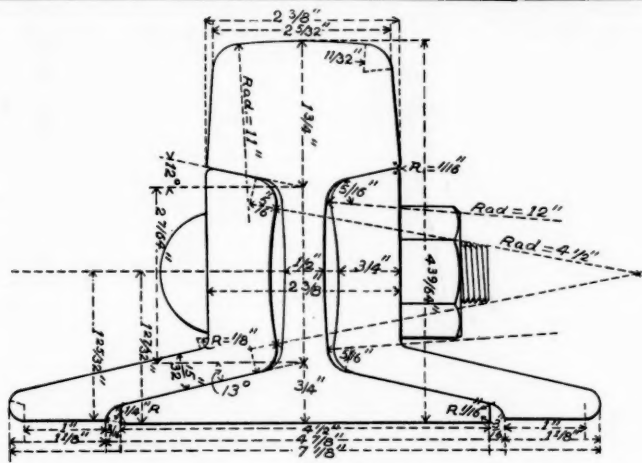
OTHER ACCIDENTS.

1st, on Pittsburgh, Cincinnati & St. Louis, near Loveland, O., a fast passenger train ran into a large tree which had been blown down upon the track, wrecking the forward portion of the locomotive and demolishing the cab. The engineer and fireman were badly hurt.

2d, on Manhattan Elevated, near Third avenue and Twenty-third street, New York City, engine of passenger train blew out a cylinder head.

11th, on Boston & Albany, at Newton, Mass., engine of passenger train disabled by the breaking of a reversing link.

16th, on West Shore, near West Point, N. Y., as an express



Section of Standard Rail and Joint.—Lake Shore & Michigan Southern Railway.

train was passing through a tunnel a portion of the roof fell in, crushing the baggage car. The train was moving slowly, the tunnel being under repairs. It was rendered impassible for several weeks.

16th, on Boston & Albany, at Wellesley, Mass., all the steps on one side of a passenger train were torn off by a large boulder which had rolled down upon the road.

26th, on Lake Shore & Michigan Southern, near Erie, Pa., the roofs of several cars in a freight train were blown off by a high wind. A brakeman was thrown to the ground and fatally injured.

A summary will be found in another column.

Standard 48-in. Joint, Lake Shore & Michigan Southern Railway.

We show in the engraving herewith a section of the standard angle splice joint of the Lake Shore & Michigan Southern as applied to a 71-lb. rail. The same splice is used with a 65-lb. rail. The splice is 48-in. long and is slotted to spike on each of the three ties. The slots are staggered in the usual way, and $\frac{3}{4}$ in. deep. The bolt holes are drilled as follows: First, 3 in. from centre of joint; between first and second, 6 in.; between second and third, 11 in. Therefore the last bolt-hole is 4 in. from end of joint. The Harvey bolt is used, without lock washers.

This joint is being extensively introduced on the Lake Shore & Michigan Southern, 47,600 of the splices having been put in this season, all with joint supported. Considerable investigation preceded its adoption.

In June, 1884, as an experiment, 12 pairs were put on, 10 pairs on new rail and two pairs on old rail. To all appearances the 10 pairs on the new rail are as good as they were when put on. The two pairs on old rail are slightly bent, caused by the joint tie getting low and remaining in this condition. It was left low in order to ascertain how long the splices would support the joint with the joint tie low. It required about two years to bend the splices.

In order to determine more fully to what extent the slotting of these splices would cause breaking, they were slotted for spikes 12 times in each splice. The slots are $\frac{3}{8}$ of an inch deep. There are no signs of fracture in any of them. The splices so far have fully realized the expectations of the designers.

It is not expected that they will allow as free play for expansion and contraction as the shortsplice, but they have not been long enough in service and in sufficient number to settle fully whether or not they will give any trouble in this particular.

The reasons which led to the use of this long joint were chiefly as follows. We quote the words of Mr. W. H. Courtney, Roadmaster of the Buffalo Division:

(1). The ties are the rail support, and the joint the weakest part of the rail. I want a support under the weak spot.

(2). When, as in the case of our suspended joints, there is only 6 in. of clear space for ballast, the jarring from the joints, particularly when the rail is worn, keeps the ballast between the joint ties loose and in a condition to take water. And it is not an unusual thing to have the ballast thrown out from between these ties when the joints are badly worn.

(3). I do not like to bunch the ties in the middle of the rail opposite the joint, as is done with the suspended joint.

(4). A suspended joint, laid as ours is, will not prevent the rail from creeping, which I consider of very great importance.

The Gissinger Axle.

We illustrate herewith an axle designed to permit independent motion of the wheels. The axle is cut through in the middle, and the two parts are held in position by sleeves, bolted together. Between the sleeves is an intermediate sleeve coupling, and two intermediate washers are fitted in the grooves shown near the inner ends of the two sections of the axle. By the coupling and washers, independent endwise motion of the parts of the axle is prevented. The parts are thus described by the inventor :

The sleeve is made of malleable iron. Five-inch bushings at each end of each sleeve, to be of wrought iron, brass or babbitt metal; those in use now are of wrought iron. Intermediate sleeve coupling of cast iron or steel. Intermediate washers of wrought iron or brass; those now in use are of wrought iron. The malleable iron sleeve is $\frac{1}{4}$ in. thick, with five $\frac{3}{8}$ -in. ribs extending longitudinally to strengthen, with cup cast on for lubricating purposes. The chamber between sleeve and axle is intended to hold sufficient grease to lubri-

cate at least a year, as the friction is small, as the sleeve revolves with the axle on straight line and does not even become stationary on curves. This is from actual observation.

The advantages expected from the use of this axle are many, chief among which are great reduction of friction and consequent saving of wear to wheels, rails, etc., with increased safety. The independent revolution of the wheels will reduce the grinding of the flanges on the rails, and it is believed by competent railroad men who have examined the appliance closely that the flanges will not wear sharp during the life of the best wheel. The freedom from wear on flanges and rails results in greater safety, in addition to a large saving in money. Inequalities in circumference of wheels paired together is immaterial where this axle is used, and this holds good in regard to brake-shoes. The great saving in power by the abolition of the grinding of the wheel treads and flanges where wheels differ in circumference, even on straight track, and even with perfectly mated wheels on all curves, need only be mentioned. Another and important saving would be in scrap-axles, by using the good half of two broken ones to make one of the "Gissinger," no change in construction being required.

This device is fully covered by letters-patent in all the principal railroad countries of the world, and preliminary steps have been taken towards the formation of a stock company for the purpose of manufacturing and fitting the axle complete.

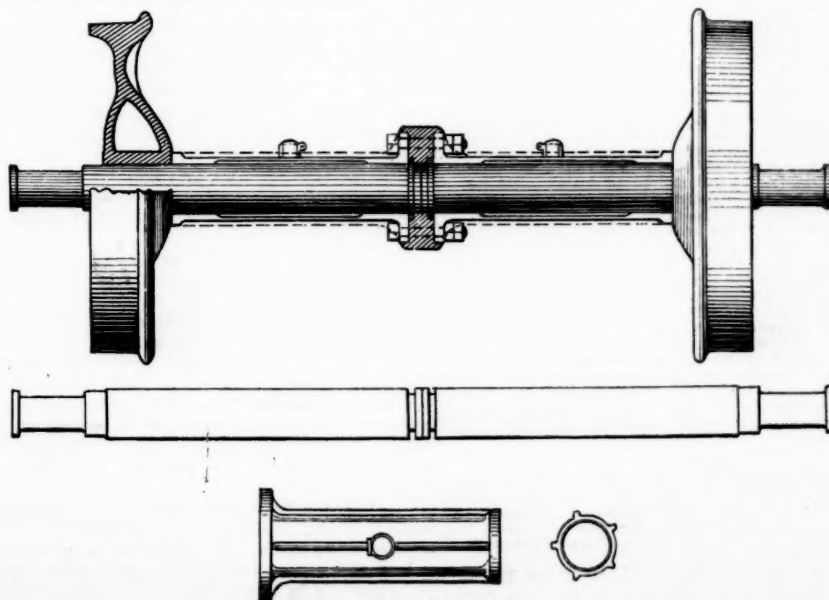
A practical test is now being had on the Allegheny Valley Railroad, at Pittsburgh, Pa., the owners of the patent having fitted up (through the courtesy of the officials of that road) a four-wheel truck under one of the company's coal flats, the other truck being fitted with the ordinary stiff axle, thereby bringing the two in direct competition, the car carrying between 50,000 lbs. and 60,000 lbs. each trip, and running over a branch known as the Plum Creek, which is noted for its many and stiff curves. The result so far has been in favor of the "Gissinger."

Not having as yet the facilities for manufacture, the actual cost cannot be arrived at, but it is estimated that in comparison with the saving to be effected it would hardly enter into consideration. Any information desired can be obtained by addressing J. E. Blackmore, Nos. 2,829 and 2,831 Smallman street, Pittsburgh, Pa.

Iron in Car Construction.

At the last meeting of the Western Railway Club Mr. G. W. Ettenger read a paper on "The Use of Iron as a Material for Cars," a brief abstract of which follows:

The Master Car-Builders' interchange rules, under which most of the railroad systems of the country make their settlements for cars destroyed, give six per cent. per annum



THE GISSINGER AXLE.

as their basis, yet I dare say there is not a mechanical superintendent present that believes a settlement on this basis represents the value of a ten-year-old wooden car of his neighbor—in fact the figures Mr. Forsyth has given me would indicate that the life of such a car is limited to 10 years, and a car costing \$500 to-day would only be worth the value of the scrap iron it might contain, less the cost of tearing down the car and handling the scrap, at the end of 10 years' service, or say one-half ton each of cast and wrought iron in body and four tons in trucks, about \$75 at the outside, instead of the \$269 bill he would be asked to approve. What it has cost the owners and operators of the car to repair and keep in order, to eke out its term of existence, is a factor of railroad mechanical management upon which accurate information is hard to acquire; but from figures in my possession, and which have been furnished me as accurate, a prominent Eastern road found the cost per annum for this branch of their service \$59 per car.

and the most economical manner of constructing the cars of wooden sills capable of being expanded and improved to a sufficient degree to meet the requirements of modern railroad freight traffic, and to keep pace in the future with the rapid increase of those requirements for increased capacity with decreased dead weight, economy of repairs, and less frequent calls for renewals? Mr. Forsyth appears to think not. He says that he finds it difficult to test the sample, and at the same time to say just what qualities are the best in lumber. Mr. Snow has built cars of timber that came in the yard in the morning green from the stump and sent the cars out running before night, but does not consider that policy of construction as proper or economical. Mr. McKenzie thinks it would not be economical to carry a year's supply of lumber in the yard, and Mr. Peterson, who has been the Barr would be willing to expend the interest to effect the saving in dead weight and repairs, and I might continue to quote numerous others who are on record as being satisfied in their own minds that the mechanical engineers of the railroads are being rapidly mustered in with their brethren of the marine and civil branches of the profession.

We might ask how far it was practicable to carry the idea advanced by Gibbs and his associates to its logical extent in the recent cars of the "Q," or making the frame of the body the foundation of the car and eliminating the extra weight this would involve in the sills by an improvement in the trussing rods, and just here I am somewhat at sea. There is no structure of which we have any knowledge that has as great a variety of strain to withstand as the framework of a freight car. Very little is understood as to what is needed for service. It is common to see recently constructed cars designed for the same service by different roads with the same general dimensions and the same stencilled capacity, with the variation of thousands of pounds of weight of empty car, the greater proportion of the excess being in the framework.

Is it not practicable to design by scientific calculation what will prove to be a structure of given dimensions and weight that will withstand the strains due to buffing, pulling, centrifugal force, gravity and shifting of the load, changes of temperature and atmospheric conditions, together with the natural decay for a reasonable period of its existence?

Assuming that you agree with me that we need some other material than wood for this, we look to iron or steel naturally as a substitute, and I would ask another question. Is the tubular an acceptable form in which with a given material to meet the requirements of freight car construction, or is the trussed frame made with iron tubes as a foundation factor capable of filling the requirements we have given as the desired—light, strong, simple, and durable, with great strength and durability, and is it by reason of its material capable of keeping pace with the other branches of railroad operation?

We stand ready to prove by the testimony of the specifications from which the cars are built that the tubular car of today is lighter in its framework for given length and capacity than any successful freight car now in practical operation. Again we carry the load on the framework of the car, and do not depend upon the superstructure to aid in doing this. You will readily understand this fully when you know that the same frame is used and is being daily loaded to its capacity of 60,000 lbs. and over on a number of our flat or platform cars that we have in the high sided gondolas. Can this be done with wooden cars? Is it not a fact that more and larger sills are put into flats than any other class of cars of equal length? The box or upper work not being called upon to carry any of the strains due to the gravity of its lading, you will readily see where our claim for lightness has another point in its favor.

Simplicity of construction is a matter that I know no persons more capable of deciding for us than the car-builders who have built 3,000 of these cars. We have their unsolicited testimonials, copies of which are at your disposal, to the effect that another thing very much in favor of this kind of car is 'ease with which it may be erected. It requires less machine work and a much less skilled class of workmen than any other car we have built in our experience of over 20 years. We could turn out over 50 per cent. more of these cars with the same labor than of any similar car of the wooden pattern.

The question of great strength is one that we lay special stress upon. We went into the field almost as pioneers of the

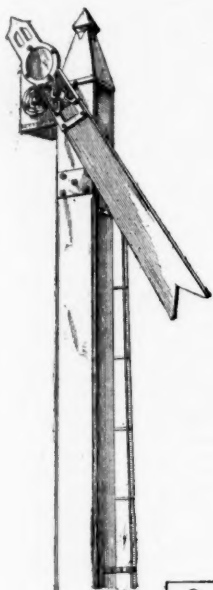


Fig. 1.
Semaphore at
Safety.

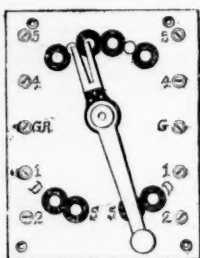


Fig. 6.
Switch for two
Signals.

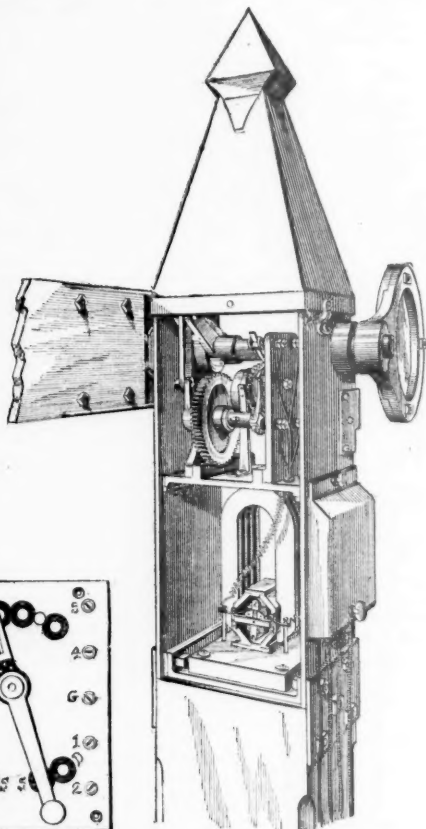


Fig. 2.
Front View of Motor Apparatus, with
Inclosing Slides removed.

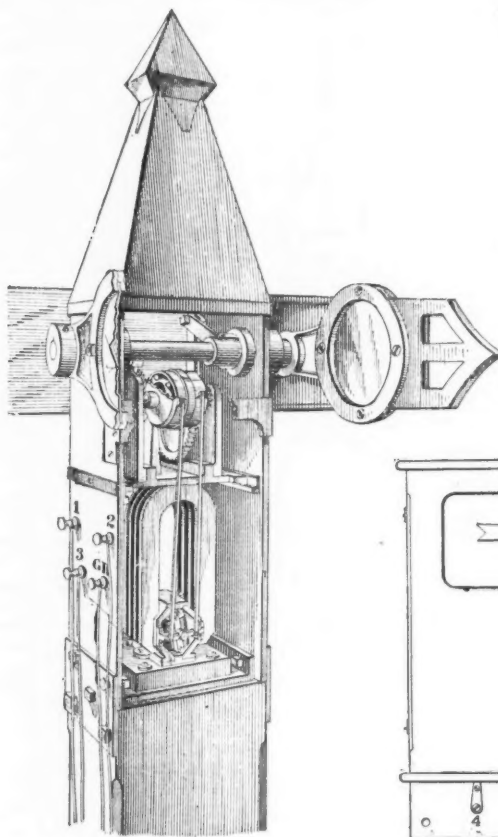


Fig. 3.
Rear View of Motor Apparatus, with Inclosing Slides
removed and parts obstructing view broken out.

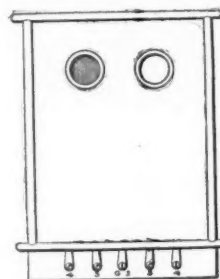


Fig. 5.
Visual Indicator for
two Signals.

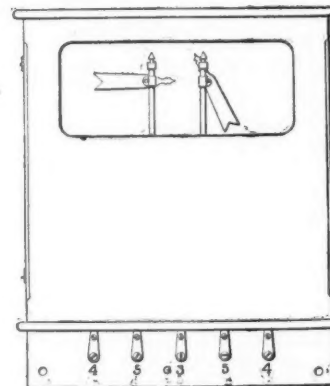


Fig. 4.
Visual Indicator for
two Signals.

LONG'S ELECTRIC SEMAPHORE SIGNAL.

Made by the PENNSYLVANIA STEEL CO., Steelton, Pa.

60,000 lbs. capacity car, and we have no occasion to regret the step. We have yet to hear of one of these cars failing under the load or even showing signs of distress from it. Some years ago I had a personal experience with operating one of the earlier cars, 1882-1885, and was deputized by the management to watch its performance. I have frequently seen that car with 80,000 lbs. of load on it, and its record of mileage was very large during that time, but up to the time it left our control the tubes were as straight as the day it was turned out of the shops.

We have used lightness as one of the points in favor of tubular framework; perhaps it may not be amiss to add some facts: Within the past four or five days I have been asked to go over the specifications of two trunk lines in widely different sections for cars designed for a diversity of traffic, and which were supposed to represent the best types of modern freight car design. I found in the first case a twin hopper gondola of the following dimensions:

Inside length of box.....	34 ft. 1/4 in.
" width ".....	7 " 1/4 "
" height ".....	3 " 0 "
Cubic feet in box.....	893
Capacity in pounds of anthracite coal.....	49,852
Limit of height from rail to top of car.....	7 ft. 4 in.
Weight of woodwork in body.....	12,744 lbs.
" wrought, cast, malleable iron and springs.....	5,528 "
Weight of trucks.....	11,500 "
Total (light car).....	29,792 "
Load.....	49,852 "
Total (loaded).....	79,644 "

Taking the dimension of limit given, the iron car would be:

Inside length of box.....	34 ft. 1/4 in.
" width ".....	7 ft. 1/4 in.
" height ".....	3 ft. 9 in.
Cubic feet in box.....	1,074
Capacity in lbs. of anthracite coal.....	60,144
Limit of height from rail to top of car.....	7 ft. 4 in.
Trucks.....	11,500 lbs.
Total (light car).....	25,348 lbs.
Load.....	60,144 lbs.
Total (with load).....	75,892 lbs.

or 5,811 lbs. heavier when loaded than the wooden car, but with a saving of 4,444 lbs. in dead weight, or a gain in paying freight of 10,192 lbs. In the other case, a flat or platform car, the sills show 3,000 lbs. as against 1,480, the capacity in one case being 50,000 lbs., and in the latter 60,000.

We have recently constructed a number of high class box cars, 34 ft. long inside, in the design of which we made no special study to reduce the weight of the upper work, yet when turned out for service they were nearly 5,000 lbs. lighter than the new cars of the P. R. R. I would state that one of these cars was loaded with 100,000 lbs. of pig iron and shunted about, yet failed to show any deflection with the load.

The behavior of cars in accidents has been carefully looked into. With 3,000 cars under our control, making a large mileage each, the proportion of cars destroyed has been almost nominal, strengthening the assertion that a shock that will seriously damage a wooden car will not be attended with disastrous results to the iron one. And we cannot see why a car that is so simple to construct should be so terrible to repair if damaged.

DISCUSSION.

Mr. ETTINGER (in answer to Mr. Hickey): The Superintendent of Motive Power of the system that operates the largest number of these cars is now preparing a statement of the actual cost of repairs, and also the cost of running the cars. He said he had already data sufficient to show that they didn't cost \$3 a year to run.

Mr. WILLIAM FORSYTH: I think, Mr. President, Mr. Etinger, in his remarks about the life of a car, has neglected to take into account the fact that the car is being constantly

repaired, and by thus keeping it up it does really have a value which is pretty nearly represented by 6 per cent. annually. I should like to ask if they have made any tests showing the difference in resistance between a wooden sill and a tubular sill?

Mr. ETTINGER: "A wooden sill" is a very indefinite expression, as they range from 4 by 9 to 5 by 12 or even 14. The sill that I referred to I think was 5 by 12. I have noticed in operating flat cars that without the truss rods the deflection was very rapid as the car was loaded, much more rapid than in a tubular car without the truss rods, comparing the tubular sill with the wooden sill without the trussing. But we make a special claim of strength. We carry the truss rods to a very great depth.

President RHODES: Have any of the master mechanics present had experience with iron sills for tanks, and, if so, will they let us know what that experience has been?

Mr. BUSHNELL: I have some that have been in use over ten years. They have been in various smash-ups and have not been very badly used up yet. In the case of wooden tanks they would have gone all to pieces.

Mr. GIBBS: Do you consider the iron tube form of truss superior to the channel bar, either to bear loads or strains arising from bumping?

Mr. ETTINGER: I think that the fact of the trial and abandonment of channel bar frames in freight car construction is one of the best answers I could give. Quite a number of roads tried channel bar frames. The great trouble has been fastening the frames together and the liability in the bolted parts of the rivet heads jumping off, owing to bumping over bad places in the track, inequalities in the roadbed and things of that nature. The liability to lose off bolts has been the great trouble with channel bars.

Long's Electric Semaphore Signal.

We illustrate herewith a semaphore signal operated by electricity, which is made by the Pennsylvania Steel Co., and has been recently brought to the attention of railroad officers. The makers claim that this signal is especially adapted for distance signaling, as it can be operated with precision and certainty at any distance required in the operation of a railroad, and in any situation that can be reached by wire circuits. In its present form the operation at 10 miles distance is entirely within its capacity, and it is said with confidence that by simple modifications much greater distances will be practicable.

Its action does not depend upon a single actuation of an electro-magnet, like most electrical devices, but it acts by many repetitions of the action of an electro-magnet, which is vitalized by alternating currents from the most simple and reliable generator of electricity known in the arts, a magneto-electro generator, which having no commutator requires no cleaning, etc., and will operate for years without attention, so long as mechanically whole. The infinitesimal part of the labor of moving the signal which has to be performed by a single pulsation of the electro-magnet used, gives an extremely large margin and prevents uncertainty under adverse conditions.

Fig. 1 shows the general appearance of the signal as mounted for operation on a wooden post about 20 ft. high, provided with a ladder. The semaphore arm, which is 63 in. long, with a wooden blade 48 in. long, has two positions, one as shown in fig. 1 indicating safety, and the usual horizontal position indicating danger or caution.

The motor apparatus by which electricity is made to operate the semaphore and place it in the desired position is all fixed inside a weather-proof iron case, 7 in. square (with removable sides), which stands on the end of the wooden post, and supports the semaphore shaft.

The semaphore shaft is provided, as seen in figs. 2 and 3, with a crank arm connected by a link to a revolving crank on the shaft of a gear wheel which receives motion through a pinion on another shaft. When the revolving crank is on the upper centre the semaphore is rigidly held in the horizontal position, and when the revolving crank is on the lower centre the semaphore is held in the safety position, and in either case can only be moved by revolving crank.

Rotation of the pinion is effected by vibratory action of the shells of two silent clutches, or ball ratchets, on the pinion shaft. The clutches consist of loose rings or shells inclosing hubs, which have a series of rollers or balls seated in inclined recesses (see broken out part in fig. 3), and movement in one direction does not move the hubs, but movement in the opposite direction causes the roller to wedge on the inclined surface and move the hubs, along with the shells. The shells of the clutches being connected by rods to the cross-arm of a vibrating electro-magnet, which vibrates rapidly when vitalized with currents of electricity, the pinion shaft is rotated, always in the same direction, revolving the gear wheel and its rotating crank. When the rotating crank comes to either the upper or lower centre, the electric currents are automatically cut off from the vibrating magnet by a rotating switch, so that when the semaphore has taken the desired position it will remain there until the vibrating magnet is vitalized by electric currents conveyed by another circuit.

When it is desired to operate from an office one or more signals, at considerable distance, say, at a junction where trains may be arriving by different routes, and perhaps other trains awaiting starting orders on distant sidings; or at a station where it may be desirable to stop rapidly moving trains, by notice given at a distance; the semaphore signals will be erected at the places where trains should be governed by them, irrespective of distance, and wire circuits from each signal led into the operating office and attached to the switch, which is also connected with visual indicators, and a magneto-electric generator, arranged for hand operation.

When either signal is to be changed the handle of the switch will be turned to the points belonging to the signal and the handle of the generator turned a few times until the indicator shows the desired position of the signal. Each indicator is actuated only by the currents that have been cut off from the vibrating electro-magnet of the signal, by the automatic rotating switch, returned by another wire to the office, and it is therefore impossible to be misled as to the position of the signal. The action of the indicator also automatically cuts out the generator from that circuit, and the completion of the operation will be detected instantly by the person handling the generator.

The indicators, two patterns of which are shown in figs. 4 and 5, may be fixed on the walls to be easily seen. Switches are made for any desired number of signals, one for two signals

is shown in fig. 6, and they can be fixed on a table or wall as most convenient. It is obvious the signals can be operated from offices so located that working a signal mechanically from them would be impossible.

For operation outside an office, as for a water station, where the trainmen would be required to operate a distant signal, the generator will be furnished in a strong iron case suitable for fastening on a post or telegraph pole. When the case is unlocked the folding handle may be drawn out. The switch, in the same case, is provided with a bell to indicate when the semaphore has taken the desired position.

It has been suggested that in case a train were improperly dispatched from a station equipped with distant signals of this kind, and the fact were discovered before the train passed beyond the semaphore, a "recall signal" could be given the train by raising and lowering the signal as rapidly as possible. Instances are numerous in which collisions, brought about by a momentary lapse of an operator or dispatcher, could have been prevented by such a "recall signal," say half or three-quarters of a mile from the station.

This semaphore signal is also employed in an automatic block signal system that has already met with considerable favor, and is going into service on a number of important railroads.

The Gold Platform Gate.

The accompanying illustration represents the form of gate used on the New York Elevated roads.

This gate can be easily operated by a brakeman standing between the cars on the platforms and clear of the entering or leaving passengers. The leverage is so arranged that when the gate is shut the hand lever *L* has slightly passed the dead centre, and consequently when once shut no pressure against the gate can move it. Consequently no passenger can alight from or enter the car until the brakeman opens the gate. This effectually prevents passengers entering the train, while in motion, a dangerous practice that prevails among suburban passengers both in this country and Europe. As far as we are aware, a gate like the one illustrated is the only effective means of preventing this dangerous practice, which results in injury to numbers, while fatal accidents are not unknown from passengers jumping out before the train is stopped, and falling under the wheels. This gate is extensively used on the Manhattan, Staten Island Rapid Transit, Brooklyn Elevated and other roads.

The ends of two adjacent cars are shown in the accompanying engravings, the upper view, fig. 1, being in plan and the lower, fig. 2, being an end view of the car. The upper part of fig. 1 shows the gates closed, and the lower part shows the gates open. It will be seen that a man standing at *A* can operate both gates simultaneously. Fig. 2 shows the lever in solid lines in the position when the gate is closed, and the dotted lines show the position of the lever and handle when the gate is open.

The various parts in the engraving are indicated by letters as follows: *B*, Platform; *D*, Link to door; *E*, Slide; *F*, Link; *H*, Handle.

The Chilean Contract.

By the last mail we received from a correspondent at Santiago, Chili, the official text of the contract for the construction of about 650 miles of railroad in Chili by an American syndicate, which has already been noticed in our columns. The document contains a message from Señor Balmaceda, President of Chili, giving a detailed history of the various proposals made by French, Belgian and Canadian companies for the construction of the projected railroads; and also the negotiations with the American syndicate, which finally terminated satisfactorily.

The reasons for rejecting the proposals of the unsuccessful bidders are given in a clear, straightforward business-like manner; likewise those for accepting that of the American company. With these latter we of the United States are most interested, and we briefly summarize them from the president's message.

The sums proposed for the different lines are considerably in excess of the engineer's estimates and congressional provision, yet are not so much so as to be unreasonable, when it is considered that they are round sums for each and every line, including all work, all material and all risks.

The bid is accompanied and the responsibility of the company guaranteed by a bond of \$1,000,000 in gold, which has been accepted by the Chilean Minister to the United States.

The government has assured itself of the absolute capacity of the American company to comply with all of its obligations. It sees in this company the means of certainly securing its much needed railroads in the times agreed upon under the conditions specified, and for a stated sum. It has satisfied itself that the reputation of the American Company, resulting from work already performed, justifies every confidence in its ability and good faith. The company has exacted no conditions from the government not already contained in its laws and general conditions, made by the Minister of Public Works and ratified by Congress.

The work to be done is to be in accordance with the plans and specifications of the government's engineers and directly under their supervision. Finally, the President says: "I believe that, considering the magnitude of this work and its great importance in promoting the development and prosperity of the nation, we should accept a proposition invested with such guarantees of seriousness, which has such strong assurances of effective and speedy execution. * * In view of these facts, and with the advice and consent of the counsel of the state, I have the honor to submit the following proposed law."

Then follows the text of the law which was passed on Oct. 19, which ratified and confirmed the contract. The terms of the contract are set forth in the following proposal by Col. Lord, for the American syndicate, which was accepted by the government.

SANTIAGO, Oct. 1, 1888

ARTICLE I. Mr. Newton B. Lord, for himself and as Vice-President of the North and South American Construction Co., promises to construct for the prices herein named and

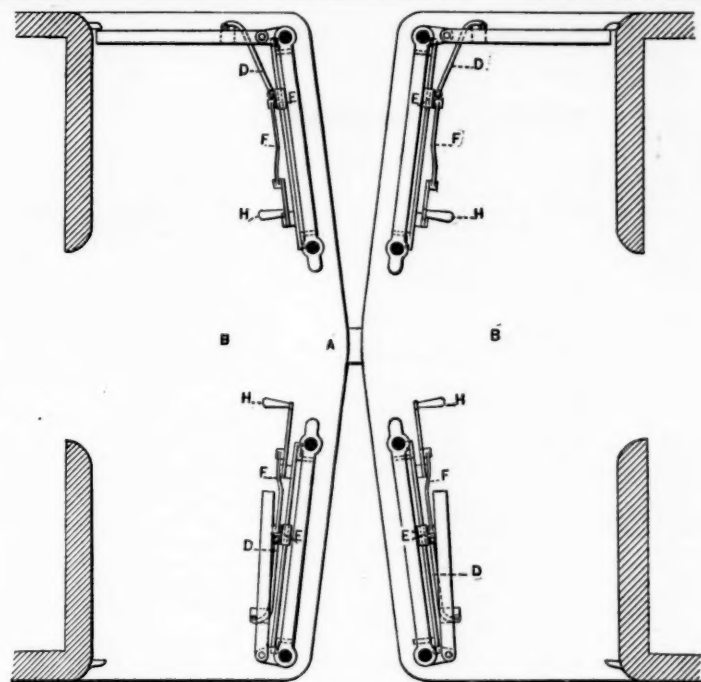


Fig. 1.

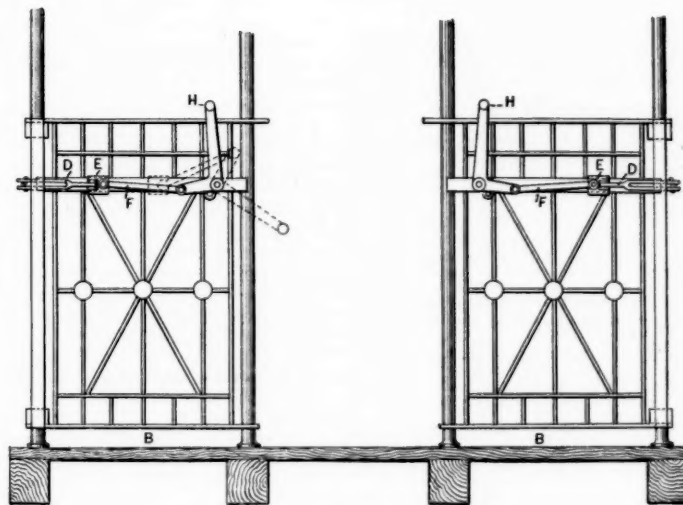


Fig. 2.

THE GOLD PLATFORM GATE.

under the conditions which are herein expressed, the following railroad lines:

Huasco to Freirina and Vallenar, 1 metre gauge, \$85,000.

Ovalle to San Marcos, 1 metre gauge, \$180,000.

Los Vilos to Illapel and Salamanca, 1 metre gauge, \$252,000.

Calera to La Ligua and Cabildo, \$330,000.

Santiago to Melipilla, 1.68 metre gauge, \$210,000.

Pelequen to Peumo, 1.68 metre gauge, \$110,000.

Palmilla to Alcones, 1.68 metre gauge, \$120,000.

Constitucion to Talca, 1 metre gauge, \$285,000.

Coihue to Mulchen, 1.68 metre gauge, \$125,000.

Victoria to Valdivia and Osorno, 1.68 metre gauge, \$1,865,000.

ART. II. Mr. Newton B. Lord will finish the lines of railroad named in the preceding article, and will deliver them to the state, for operation in the times which are expressed hereafter, counting from the day on which the Directory of Public Works, through its delegated engineers, shall deliver to the contractor, asked out and ready for work, a portion of each line, sufficient for active and constant work, said engineers having also delivered the documents which may be necessary, and which are enumerated in Art. I. of the general conditions, to wit:

The railroads from Santiago to Melipilla, from Pelequen to Peumo, from Palmilla to Alcones, and from Huasco to Freirina and Vallenar, in the term of two years. The railroads from Calera to La Ligua and Cabildo, from Ovalle to San Marcos, from Los Vilos to Illapel and Salamanca, from Constitucion to Talca, and from Coihue to Mulchen, in the term of three years, and the railroad from Victoria to Valdivia and Osorno in the term of five years.

ART. III. The contractor will be responsible for the stability of each line until its definite reception, which will be one year after the provisional reception. He must begin the work of four lines within the period of one month; two of the other four in the period of two months and the rest in the period of three months, counting from the day expressed in the first clause of this article.

Each one of the prices indicated in Art. I is the bulk sum which will be paid to the contractor for the execution of all and every one of the works which is comprehended in construction and equipment of the lines of railroad enumerated in said article, at the cost and at the risk of said contractor, in conformity with the plans of the engineers of the government, of which the contractor has due knowledge; and of all structures and of the rolling stock and the stations and the permanent way, etc., named in the specifications of the engineers.

Each line being finished, there will be an exact kilometrical measurement, and if there shall result any extension greater than that established by the specifications, there shall be paid to the contractor the value corresponding to it, taking as a base the mean price per kilometre of the length established for the line; and if there shall result any diminution

of the length of the line the price paid shall be diminished in proportion, but the third part of such diminution shall result to the benefit of the contractor. The contractor will be paid according to the respective series of prices for units of work and materials, calculated by taking for base the respective lines, and the prices fixed in the estimate of the engineers of the government, increasing said prices proportionately to the difference which there may be between the bulk sums named in Art. I. and the net estimates of the engineers for each line. This series of prices shall have for sole object a valuation of the works executed and of the materials delivered upon the works at the end of each month for the purposes of monthly payments; which payments shall be made on the 8th day of each month; and, likewise, for the estimation of the work done by the contractor in case of liquidation, and for the valuation of the works, more or less, as the case may be, conformable to the disposition of this contract and of the general conditions attached thereto.

ART. IV. If the contractor shall not deliver any of the lines within the time fixed in Art. II, he shall forfeit for each day of delay a sum of \$10 for each kilometre of the line which may not be finished.

ART. V. * * * In the railroads of 1.68 metres gauge the contractor will use rails of Bessemer or Siemens steel, of 30 kilograms weight per running metre (60.5 lbs. per yard); and in those of 1 metre gauge, rails of the same kind of steel of 20.448 kilograms per running metre (41 lbs. per yard), subject to modifications on this particular point which may be indicated in the special specifications.

ART. VII. The bridges shall be of the American system of pin truss bridge of laminated or wrought iron, and wood shall only be employed in the ties and guard-rails. The Director of Public Works will fix, before beginning the construction of the bridges, the general types of the same, and will fix, also, the proof weight to which said bridges shall be submitted. The contractors cannot begin the construction of any of the bridges without previous approval of said general type by the Minister of Public Works.

ART. VIII. The different times indicated in Art. II, shall be proportionately increased if for any cause there shall be change in the location of the line previously authorized by the government, said change producing an augmentation in the quantities of the work, as indicated in the specifications.

ART. IX. The government may introduce modifications into the locations if it sees fit. If these modifications authorized by the government shall increase the work above the specifications the value of said increase will be paid for. If the quantities shall be diminished the value of such diminution will be considered in the payment, giving the contractor one-third of the sum represented by such diminution.

ART. X. The contractor can import from foreign countries and for the works of the lines of railroad, such artisans and laborers as he may think necessary, and the Govern-

ment will pay for each of the first introduced into the country, up to 1,000 in number, the sum of £12, and for each of the second, up to 5,000, the sum of £10. It is expressly forbidden to the contractor to introduce any individual of the Asiatic race.

ART. XI. The contractor will have freight and passage free over the railroads of the state for all the materials of construction and for his engineers, employes and laborers, subject to the rules and regulations which may be established by common consent for this purpose.

ART. XIII. This contract is guaranteed by the bond of the syndicate in whose name the contract is made by Mr. Lord by for \$1,000,000 in gold, to be certified as satisfactory by the Minister of Chili to the United States, Senor Emelio Crisologo Varas. The contract being approved by the Congress of Chili, Mr. Lord obliges himself to substitute within a period of 50 days for the bond above mentioned another one constituted in Chili, for \$1,000,000, in the current money of the country and to the satisfaction of the government. Mr. Lord will not receive any payment on account of this contract before said substitution in Chili of the guarantee has been accomplished.

ART. XIV. The payment for the work done and for the material delivered will be effected in the manner determined by the general conditions hereto attached, but the payment for rails and their accessories, engines, cars, bridges and hydraulic cement, will be made when delivered on the work or in store or at ports of the country where said material may be received. The payment for materials which may be imported from abroad will be made in letters of credit upon London at 60 days' sight, and the payment for labor and materials of the country in current money at the rate of bank exchange upon the day on which the payment is made. In each payment there will be retained as a guarantee for fulfillment of the contract and the perfect execution of the work 30 per cent. of the value of the rails and their accessories, 20 per cent. of the value of the locomotives and cars and 10 per cent. upon all other kinds of work and material, estimated monthly.

ART. XV. As often as the value of these retentions shall rise to the sum of \$100,000, the contractor can ask the substitution for them of an equivalent value of the fiscal bonds of the public debt of Chili, or hypothecate bonds issued in accordance with the law of the 29th August, 1855, or by a deposit in a bank at the end of each six months, and to the order of the government until earned.

ART. XVI. As each half of the lines of railroad above named is finished, excepting that from Victoria to Valdivia and Osorno, the Director of Public Works will proceed to the provisional reception of the line, and, having made a liquidation of its value, the retained percentages made on the monthly payments will be returned to the contractor for so much of each line as is finished.

The same provisional reception, liquidation and return of percentages will be made to the contractor as each one of the six sections is completed, into which the line from Victoria, Valdivia and Osorno is divided, as in the specifications of Engineer Senor Lastarria.

ART. XVII. The guarantee of \$1,000,000 established by Art. XIII. will be cancelled proportionately to the value of each line which may be completed, and at the expiration of the year of proof of stability prescribed in Art. II., but on the line from Victoria to Valdivia and Osorno the guarantee will be cancelled for the first two sections which may be concluded, after they have been delivered to the government and submitted to a year's proof of stability. The guarantee for the other four sections will remain in force until one year after the final completion of the last section. Likewise, the responsibility of the contractor will remain effective, and the retained percentages will be held until the final delivery of the works in accordance with this contract.

ART. XVIII. The contractor can introduce free of all custom duties materials for construction which he may import from abroad, the machinery and the necessary tools for the work.

ART. XIX. This contract will be perfected and obligatory upon the contractor and the Government of Chili after its approval by the National Congress.

ART. XX. All difficulties and contentions of whatever nature which may occur in the interpretation and execution of this contract will be summarily decided without further recourse by three arbitrators, named, one by the Minister of Public Works, the other by the Supreme Court and the third by the contractor.

(Signed)

THE NORTH & SOUTH AMERICAN CONSTRUCTION CO.,
by NEWTON B. LORD,
Vice-President and Manager.

Notes on Fuel and Combustion.

By R. H. BUEL, C.E.

V.

GASEOUS FUEL.

Prof. Charles A. Ashburner states that wherever there are petroleum deposits, "there and in the surrounding regions rock-gas is sure to exist."

In the early days of oil seeking the gas issuing from the wells was allowed to escape, being considered of no value. Within a few years gas wells have been explored and the gas carried in pipes to points where it can be used for manufacturing and domestic purposes. The composition of natural gas varies considerably at different wells, as will be seen by the table of analyses herewith presented:

Elementary Analyses of Natural Gas.

LOCALITY.	Parts by weight in 100.				Specific Gravity (Dry air = 1)
	Carbon.	Hydrogen.	Oxygen.	Nitrogen.	
West Bloomfield, N. Y.	67.0	21.1	7.6	4.3	0.693
Olean, N. Y.	73.4	24.3	2.3	0.02	0.692
Butler County, Pa.	71.1	28.7	0.2	0.01	0.615
Harvey Well, Pa.	64.7	34.8	0.5	0.01	0.511
Cherry Tree, Pa.	51.2	39.0	2.5	7.3	0.558
Leechburg	71.4	28.2	0.4	0.01	0.592
Creighton	73.2	24.2	2.6	0.01	0.592
Murrayville	58.6	39.2	2.2	0.01	0.610
Average	66.3	29.9	2.3	1.5	0.610

Other varieties of gas, such as coal gas, water gas, generator gas (formed in the producer of a Siemens furnace), wood gas and peat gas, are occasionally used as fuel. The average composition of these gases, together with that of the gas escaping from marshy ground, are shown in the accompanying table:

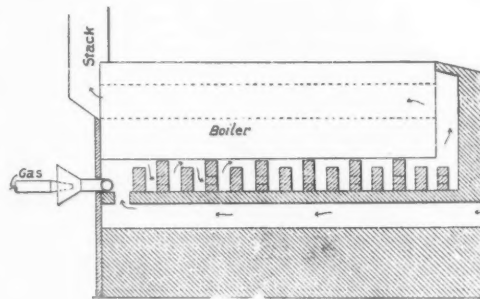


Fig. 5.

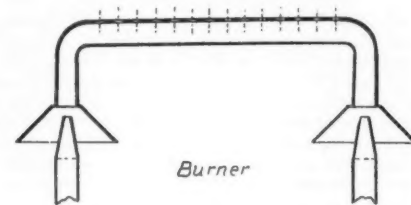


Fig. 6.

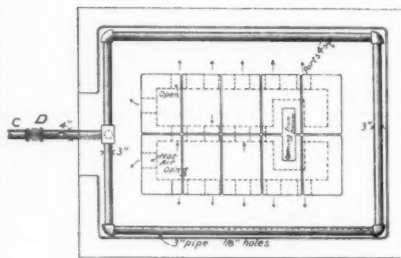


Fig. 3. Horizontal Section.

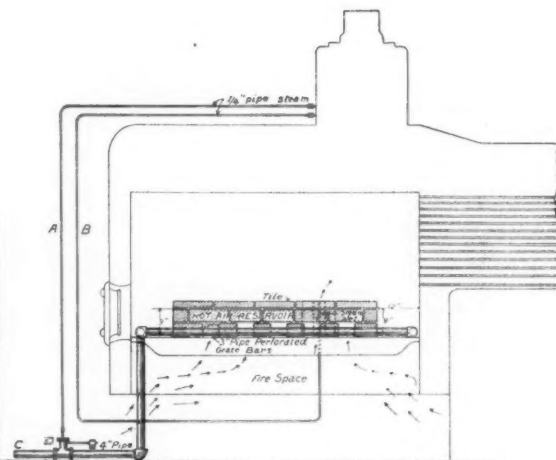


Fig. 4. Longitudinal Section.

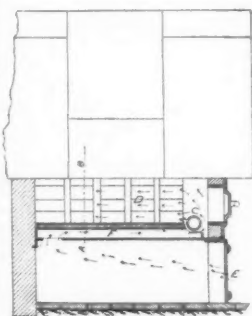


Fig. 1.

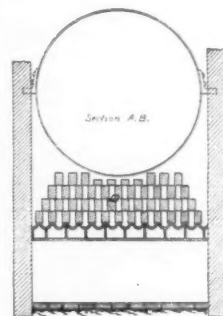


Fig. 2.

Elementary Analyses of Different Varieties of Gas.

KIND OF GAS.	Parts by weight in 100.				Specific Gravity (Dry air = 1)
	Carbon.	Hydrogen.	Oxygen.	Nitrogen.	
Gas from marshy ground	36.3	11.9	2.4	49.4	0.78
Generator gas, Siemens furnace	12.6	0.8	20.1	66.5	0.78
Water gas (Strong's process)	35.6	8.6	47.0	8.8	0.541
Wood gas	39.4	42.4	18.2	0.01	0.663
Peat gas	46.4	42.4	11.0	0.2	0.663
Coal gas	42.8	48.1	6.6	2.5	0.400

Natural gas has long been used in some localities as fuel for steam boilers, the arrangements for burning it being generally of the most primitive character—a pipe being placed in the furnace, and the gas issuing from the extremity being ignited. Recently, as the use of gaseous fuel has become more general, many varieties of burners have been devised. These burners may be divided into three general classes:

1. Burners in which the gas unites with the air necessary for combustion, after issuing from the pipe.
2. Burners in which the jet of steam is admitted into the gas pipe for the purpose of increasing the draft.
3. Burners on the Bunsen principle, in which air is mixed with the gas before its issue from the pipe.

Heat radiators, composed of fire-brick, are usually placed within the furnace, and are often arranged so as to heat the gas and air supplied for combustion.

Representative forms of the foregoing types of burners are shown in the accompanying illustrations, which were kindly furnished by Mr. Chas. Paine, Vice-President and General Manager of the Philadelphia Company, suppliers of natural gas.

In figs. 1 and 2 the gas issues from perforations in a pipe C, placed across the front of the furnace. Air enters at the ash-pit door E, and is heated by passing through the flue F before entering the furnace to mingle with the gas issuing from the pipe C. The furnace contains layers of fire-brick D, with interstices between them for the passage of the flame and products of combustion.

Mr. Paine furnishes the details of an experiment with a burner of this general character, as follows. The test was made with a cylindrical flue boiler, 48 in. in diameter, 18 ft. long, and containing 17 flues each 6 in. in diameter.

Tanks were used to measure the water evaporated and a wet meter for the consumption of gas.

Date of test	Sept. 14, 1888
Duration of test	12 hours
Temperature Fahrenheit, degrees:	
Air	56.5
Feed water	68.
Gas	64.
Flue	475.
Pressure per square inch above the atmosphere:	
Steam	75 lbs.
Gas in burner	0.175 oz.
Gas in meter	25.91 "
Pounds of water evaporated every hour:	
Under actual conditions	1349.35
From and at 212°	1597.63
Consumption of gas per hour:	
Under actual conditions	2000 cu. ft.
At 62° and atmospheric pressure	2184.98 "
Pounds	96.8
Pounds of water evaporated from and at 212°	0.731
Per cu. ft. of gas at 62° and atmospheric pressure	16.5
Cubic feet of gas required to evaporate one pound of water from and at 212°	1.305

A form of burner with steam regulator and steam jet is shown in figs. 3 and 4; A being a steam pipe connected to the gas-pipe C, and having a weighted valve D, by means of which the amount of steam admitted can be regulated, thus controlling the rate of combustion. B is a steam pipe terminating in an ordinary steam jet within the furnace. The furnace contains a hot air reservoir, as shown, for radiating heat and heating the air supply.

A burner of the Bunsen type is illustrated in figs. 5 and 6, so plainly delineated as to require no further explanation. It is stated that by the use of this burner 1 lb. of water was evaporated by the consumption of 1½ cu. ft. of gas.

Continuous Heating on the Atchison, Topeka & Santa Fe.

At the last meeting of the Western Railway Club Mr. Houston gave some account of the heating system in use on the Atchison, Topeka & Santa Fe. He said: We have experimented a great deal and have finally reached a system of heating that we are putting on to the Santa Fe roads. The trains this side the Missouri River are pretty nearly complete, and we are putting them on as fast as we can across the continent. Our arrangement is practically a hot water system, without any reference to the steam. If the car is taken on cold we use steam to heat the car up quickly. When it goes out of service it is drained out and goes into the yard cold. This heater is so arranged that it makes an open hot water circulation. We carry no pressure. That is a point that we are rather proud of, because the hot water men told me repeatedly that it was a thing that could not be done, but we did it successfully. The heater itself carries reserve water enough to fill the pipes of the car. At any time we can fill

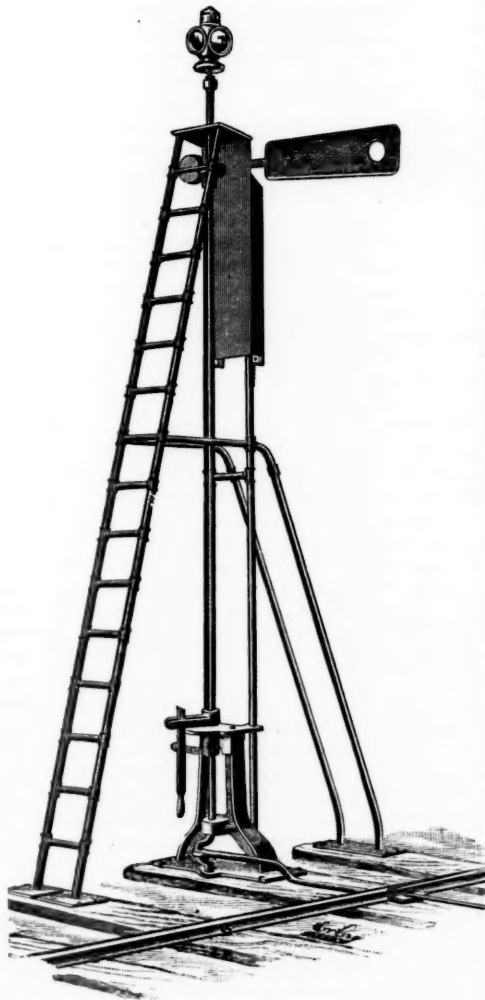
the steam pipes with hot water already contained in the heater, build our fire and get circulation in about 30 minutes. The heater is made with reference to an easy circulation. The heater is at one end of the car, occupying the place ordinarily occupied by a stove, and the steam is taken at the opposite end. The flow of steam and condensation is all in the same direction into a central tank or little pot that we call the drip pot, and by that means we avoid any danger of having trouble with frost. That drip pot carries a drip pipe, and the water as it gathers in there is forced into the steam pipe. We have no escape of steam. That is one point in our success. I have found that the escaping steam in the different compartments of a train is what makes the trouble. Our train pipe is very simple, and the coupling is metallic, held together by a spiral spring. The coupling is so made as to avoid any possible danger from excessive steam pressure. Every coupling in the train would blow off at 70 lbs., and as long as they are used there is no danger of an explosion anywhere. While the engine is standing we use dry steam from the boiler; the moment the engine moves so that there is exhaust steam we use that and nothing else. We regulate the heating of each car by the amount of steam admitted. We have sufficient power to enable us to ventilate our cars very nicely, and that is a matter of a good deal of importance.

We have made a test with a train of eight cars. I don't know but the rear car was just as good as any of them. The point is that you must not waste any. If you do you will not get to the rear. Our calculation is to heat the rear car first, and thus get rid of the condensation. The pressure that we get from the exhaust runs as high as 15 lbs., and we have check valves, so that we utilize the excess of pressure all the time. We ran a train of three cars the 1st of last January from here to Ft. Madison, and the gauge showed an average of 9 lbs. all the time. I don't know that it went below 9 lbs. during the entire day. That day we carried in one of the cars a thermometer hanging at the side of the car that did not go below 60 nor above 64 during the entire run. Of course at and under the seats it would be 70 or over. There is no danger of freezing for the reason that the water is drawn off when there is no fire, and the boiler and pipes are drained. A couple of hours run, or less, will furnish the quantity of water again. The fire is controlled by a steam jet. It is very safe, and at this time of year the fire would stay in the whole night. There is very little trouble with the fire burning out through carelessness, and the heater is so constructed that if you should happen to build a fire without water it is not expected to spoil the heater. Pipes are run only along the sides, two on a side, and for about a quarter or a third of the way we run three at each end.

Mr. Gibbs thought it evident from the amount of piping mentioned as compared with the amount he had experimented with last winter that the Santa Fe does not run through as cold a country as the St. Paul.

Morden's Semaphore Switch-stand.

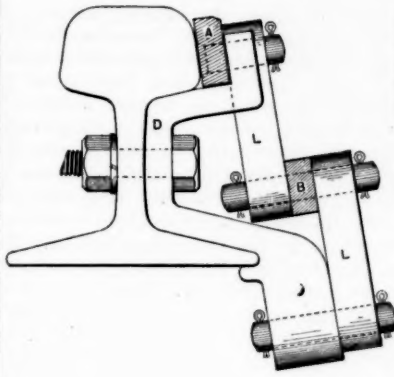
The accompanying cut shows a semaphore switch stand in which the switch and target are thrown simultaneously by



Morden's Semaphore Switch-stand.

the same lever. The target being operated from the crank-rod by a bevel gear, there are none of the objections which apply to a wire rope or chain connection. When the target is down it is hidden from view either way by a sheet-iron sheath.

The lamp is placed on the top of the semaphore on the pro-



REIFF'S DETECTOR BAR.

longation of the crank-rod; thus the lamp, target and switch are thrown simultaneously by the same lever. The stand or base is cast iron, and the uprights are tubular, as is the ladder.

This semaphore has been in use for some time on the Wabash, Grand Trunk and Western Indiana, in each instance giving satisfaction. It is made by the Morden Frog & Crossing Works, of Chicago.

Reiff's Detector Bar.

This detector bar has the novel feature of being raised and lowered, without other motion, by means of the movement of the middle bar B, which operates through the toggles L L. The lower toggle is attached to the clip or bracket D, which is bolted to the rail, and not only supports the entire appliance, but furnishes the vertical track or guide on which the rollers work, which hold the detector bar to its vertical movement. The same piece also holds the bar in position against the rail.

The points of superiority claimed by the inventor for this detector bar are briefly as follows: It has a direct acting vertical movement, and is operated with a throw of only 2 1/4 in. of the bar B, and this requires so little power that it is possible to connect a number of bars to one lever, making is specially desirable at railroad crossings, where double slip switches are used. Another special feature is, that the slight movement of the bar B, and the vertical movement of the detector bar make this appliance particularly free from danger of becoming clogged by snow, dirt, etc. The vertical movement of the detector bar is 3/4 of an inch, and by keeping this movement within such limits the power required for operating is reduced to a minimum.

These bars are now in operation at fourteen different points, where switches are interlocked, on the main line division of the Philadelphia & Reading, and have given entire satisfaction. Further information can be had from the inventor, G. N. Reiff, Reading, Pa.

Value of Old Railroad Material.

The following schedule gives the prices received per 100 lbs. for old material by the Northern Railroad of France:

Axles, iron, car	\$0.70
" " tender	.70
" steel, car	.44
" " tender	.44
Brass, common	8.77
" turnings, clean	7.45
" filings	According to condition.
" turnings, mixed	According to condition.
Bronze, phosphor	6.11
" turnings	4.39
Brake heads, cross-heads	.31
Copper, red, sheared plates	9.21
" " scraps	8.34
" " tinned	7.02
" lanterns, wire, etc.	7.02
" red, clean turnings	7.45
" " mixed	According to condition.
" yellow, cast and scrap	5.70
" " plates	6.14
" " turnings	4.39
" " filings	According to condition.
Cells, zinc	.88
" porous	.44
Cylinders, engine	.44
Grates, wrought iron	.40
" " cast iron	.35
Files	.79
Castings	.48
" malleable	.31
Iron turnings, wrought iron, large	.32
" " small	.26
" " and dirty. Accord. to condition.	.18
" " cast	.18
" large sheets of	.44
" small	.35
" sheets of burned	.22
Leather scrap	.31
" shank	1.31
" breast	3.33
Lead	.09
" hemp and flax	1.58
Malleable cast iron	.31
Rags, oily	.44
Rope	1.21
" tank	.70
Oil residuum	.57
Steel springs and tools	.61
St. el plates	.79
Tanks	.62
Tires, steel	.62
" iron	.62
" blind iron	6.58
Tubes, yellow copper, cleaned	5.70
" " uncleaned	.35
" iron, uncleaned	.48
Tool scrap	.52
Scrap iron	.44
Wheel centres, steel	.35
" " wrought iron	.35
" " cast iron	3.33
Zinc	

TECHNICAL.

An Improved Method for Finding the Diameters of Cone and Step Pulleys.

At the Scranton meeting of the American Society of Mechanical Engineers, Mr. C. A. Smith presented a paper on the above subject. The author first presented some simple graphical methods and then discussed the question analytically, deducing general equations which he showed by comparison to be far more accurate than those given by most writers on mechanism, and to be, in effect, practically exact. The equations, in their simplest form, are reproduced below.

Formulas for cone pulleys with open belt.

A = the angle in degrees between the centre line and the belt of any pair of pulleys.

A₁ = the angle in degrees between the centre line and belt of the first pair of pulleys.

a = 0.314 for belt angles less than 18°.

a = 0.298 " " between 18° and 30°.

C = Distance between centres of pulleys.

D and d = diameters of a pair of pulleys (D > d).

D₁ and d₁ = diameters of first pair of pulleys.

E = an angle depending on the velocity ratio.

E = " " B.

L = length of the belt.

r = velocity ratio = $\frac{D}{d}$.

1.— $\sin A_1 = \frac{D_1 - d_1}{2C}$.

2.— $\tan B = \frac{2a \times (r - 1)}{r + 1}$.

3.— $\sin E = \sin B \times \left(\cos A_1 - \frac{D_1 + d_1}{4aC} \right)$.

4.— $a = \begin{cases} B - E & \text{when } \sin E \text{ is positive.} \\ B + E & \text{" " negative.} \end{cases}$

5.— $d = \frac{2C \times \sin A}{r - 1}$.

6.— $D = r \times d$.

7.— $L = 2C \times \cos A + 0.01745 d \times \left\{ \frac{180 + (r - 1) \times A}{(90 + A)} \right\}$.

Formulas for cone pulleys with crossed belt.

8.— $d = \frac{D_1 + d_1}{r + 1}$.

9.— $D = r \times d = D_1 + d_1 - d$.

European Canals.

At a well-attended meeting of the General Committee of the subscribers to the fund for the preliminary expenses relating to the proposed Sheffield Ship Canal, it was unanimously resolved that a limited liability company be formed to make application to Parliament for authority to acquire the Don navigation and subsidiary canals from the Sheffield & Lincolnshire Railway Co. The meeting was unanimous in its views of the importance of providing an adequate waterway for Sheffield.

The proposed tunnel to connect Sweden and Denmark seems to have been definitely abandoned, through the commission appointed to examine the project having decided that the amount of traffic offering would not be materially increased by the tunnel. But the Danish engineers are now planning a ship canal between the North Sea and the Kattegat. The proposed point for starting the canal is at a harbor on the west coast of Jutland, near Nodhus, and from there the route joins the Limfjord, 3 miles, and that deep sound would be followed to Hals, on the east coast of Jutland. The whole length of the canal would be but 9 miles, and it would save 21 miles of dangerous navigation around the Skag, a route now taken by about 50,000 vessels annually. The estimated cost is 36,000,000 kroner, or \$9,648,000.

A New Process Steel.

A company in Paducah, Ky., have acquired the patents of Mr. W. B. Forsman, of Louisville, for steel making. This in effect is a substitution in the pneumatic process of oxygen and hydrogen for common air, with the addition of fluxes. The oxygen and hydrogen is obtained by passing steam through an intensely heated coiled iron pipe in which it is reduced to its elementary gases. The rationale of this substitution is that the hydrogen will combine with the carbon in the iron, forming a hydrocarbon which will be burned by the oxygen, but some air in addition to the oxygen, furnished by breaking up steam, will probably be required to complete the combustion. The fluxes, which are to be added during the blow, consist of the bases of lime, manganese and aluminum, with fluorene, and are intended to form a slag which floats on the top of the melted iron, which is drawn off into molds.

It is claimed that by this process the entire output of the Paducah Iron Company's blast furnaces may be converted into steel blooms bringing from 25 to 50 per cent. more than pig iron.

Montreal Ice Railroad.

A contract has been awarded for the building an ice railroad on the St. Lawrence for the Montreal Winter Carnival. One firm offered to build and operate the railroad at their own risk for a bonus of \$2,000. Mr. Roberge, who built the first railroad across the river for freight purposes, offered, for a similar consideration, not only to build and work the railway, but to give the committee 25 per cent. of the profits. The latter offer was accepted.



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EDITORIAL ANNOUNCEMENTS.

Contributions.—Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and in their management, particulars as to the business of railroads, and suggestions as to its improvement. Discussions of subjects pertaining to ALL DEPARTMENTS of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.

Advertisements.—We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay, EXCEPT IN THE ADVERTISING COLUMNS. We give in our editorial columns OUR OWN opinions, and those only, and in our news columns present only such matter as we consider interesting, and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.

The main features of the form of agreement which it is said some of the Southwestern roads have been considering are printed in another column. It bears marks of careful work and is of some interest, whatever its origin. But as with all other voluntary agreements the first point is "to catch your hare." The attitude of the important roads whose consent is yet to be obtained has undergone no change and gives no promise of any better results than we have had in the past. The provisions for putting officers upon their oath, for sworn statements, for re-affirming sworn statements and all the intricate devices for making men honest, fair and far-sighted by machinery, which have come to be so common in propositions for traffic agreements, are significant evidence of the difficulties to be encountered by any one who attempts any improvement of affairs. The interests of the roads mentioned in the present rumors are spread through such an immense territory and are so interlaced that anything short of absolute consolidation seems under present conditions to offer only temporary relief. The Southwestern roads are in some respects better off than those in the Northwest, but their situation is not so favorable but that every effort of this kind is to be commended, in the hope that something may be effected. Heroic remedies are not generally applied until the malady becomes desperate; the present one is certainly serious enough.

We give elsewhere an abstract of the preliminary report of the Directors of the Erie. This preliminary report does not contain the balance sheet or full tables of traffic statistics, and therefore we shall attempt but little comment on it in this issue. One fact which will attract notice is that the Erie is almost alone among the great lines in increasing its net earnings. The gross earnings increased 2.45 per cent., the operating expenses 3.52 per cent., and the net earnings 0.14 per cent. On the Erie proper, excluding the New York, Pennsylvania & Ohio, the increase in gross earnings was 3.15 per cent., in operating expenses 1.45 per cent., and in net earnings 6.35. By comparing these figures the unfavorable effect of the N. Y. & O. on the general result is obvious, and the President calls attention to the weakness of that road in the new forms of competition encouraged by the Inter-state Commerce Act. The policy of the present administration has been to encourage local business rather than through, and it is probable that under the conditions of the New York, Pennsylvania & Ohio lease, this policy has been more vigorously followed than it would have been had the Erie been in better shape to compete for through business. It is said that orders for cars from local stations have been filled in preference to those for through business, and that it is probable that never before were local wants so promptly and fully supplied. The demands of the coal traffic have also been

sedulously studied, with the result of making the Erie now probably the largest coal carrier in the United States, after the Pennsylvania. The gross earnings of the system increased \$650,000, but from general freight they decreased \$1,091,000, and from coal they increased \$1,444,000. The net increase from these items is \$358,000. The balance of the increase in gross earnings comes from passengers, \$52,000; express, \$112,000, and miscellaneous, \$136,000. Notwithstanding the low rate on coal, 0.611 cent per ton per mile, as compared with general freight, 0.808 cent, the immense importance which the coal traffic has assumed is apparent. Another matter of particular interest in this report is the course of the passenger business. There is a slight increase in earnings, one per cent., with an increase of about 25 per cent. in the total passengers carried. The earnings per passenger per mile decreased 9 per cent., and the haul fell from 27½ to 25 miles. The local passengers increased 27.81 per cent., and the last year made 95.51 per cent. of all. The decrease in average haul and in average rates, as well as the great increase in passengers carried, is accounted for largely by the development of the suburban business at reduced rates. In the last two years the Erie has made special efforts to develop this business, by means of commutation and family tickets at low rates, and by increase in the speed and number of trains, and in the quality of the service generally. The result appears in this report.

Air brakes and hook couplers were put into use on passenger trains with great rapidity after they reached good working shape, not only because the conditions of that traffic are simpler and more uniform than those of freight traffic, and not only as means of safety and economy, but because competition compelled it. The road which offers, or can make the public think it offers, the most safety and comfort for a dollar is that which, other things being nearly equal, will get the most passengers. In the passenger business, therefore, the roads could not afford to wait and balance the question of direct gain or loss from the use of the improved appliances. Whether it cost them more or less to run trains with air brakes than hook couplers was not the vital question. They had to use them or lose patrons. There were one or two notable instances of important trunk lines which were slow to adopt the air brake in its best form; but even they learned finally, through accidents that alarmed the public, that they could not afford to be behind their competitors in safety equipment. In freight service the matter is very different. Here it is a matter of economy pure and simple. The question is whether or not the ratio of operating expenses to gross earnings can be diminished by the use of continuous brakes and automatic tight couplers. The question of humanity to trainmen enters to some degree undoubtedly, but unfortunately the stockholder does not enter up humane intentions to the credit of the manager. His success is measured by financial results, and we do not remember a case in which the directors or shareholders of a railroad company have congratulated the operating officers of a road on a reduced mortality among trainmen. Whatever may be the opinions of the officers as to the economy or the other advantages of improved appliances their expenditure for them must be to a considerable degree controlled by the sentiment of their directors, as in theory, expressing the wishes or orders of the shareholders. But the freight shipper has not yet learned to consider whether or not a line uses air-brakes or automatic couplers, and perhaps he never will. He may find that one line gets his goods through in less time than another, and in better shape, but he is not likely to seek for the mechanical reasons or to care about them. The element of competition may, however, act directly to hasten the use of these appliances in the live stock business. At a convention lately held in Chicago the following resolution was adopted: "Resolved, that we, as cattle growers and shippers in national convention assembled, realizing the great suffering of cattle shipped and the loss to shippers by bruised and injured meat, caused by shocks in cars while in transit, believe it is opportune and even a duty to say to the great transportation companies that we are inclined to give our patronage to such companies as equip their stock cars with such brakes and close couplers as will prevent suffering to stock and loss to shippers." If it is settled that stock arrives at its destination in better condition in cars so equipped, the inclination expressed in this resolution will not be confined to the shippers represented at that convention, but will spread and will have an effect in hastening the fitting of stock cars with air brakes and close couplers. Trains of air-braked cars will doubtless be

run faster, generally, than those with hand brakes only, and the stock being a less time in transit, will for that reason be delivered in better condition. Close coupling will lessen the shocks of stopping and the motion by running, and in that way will save the stock. But until the runners acquire skill and care in handling air braked trains, the acceleration of speed and the quicker stops will perhaps increase the evils complained of.

The considerable delays to suburban trains to and from New York city on the New York, New Haven & Hartford, which have been constant for several months, have been inquired into by the New York Railroad Commissioners, and some of the reasons for them are explained by the road in a letter to the Board.

First, and chiefly, is the overcrowded condition of the Grand Central station and yard. The one minute interval between trains departing from New York was found insufficient and has been increased. The complainant before the Board resides in Mount Vernon, but the letter states that it is impossible to make up lost time before reaching that place, because the distance on the New Haven Track is less than 2 miles. It is believed that the sensible and observing patrons of the road appreciate the difficulties with which the road has to contend and are content to await the efforts of the management to remedy them. With a rearrangement of the Grand Central station and yards, and with the completion of the four tracks upon the New York Central as well as the New Haven road, it is believed that satisfactory service can be rendered. The letter states that negotiations are in progress for such changes in the use of the Forty-second street station and yard as will better accommodate the business. It is also stated that the present time-table, the peculiarities of which have been described in these columns, was necessary in order to relieve the crowded condition of the waiting room. Only by a re-arrangement of the train service was it possible to have the waiting-room doors opened earlier and to provide a number of trains ready to accommodate the crowds of passengers from which the waiting-room had to be relieved.

We cannot see much hope of remedying the present evils by any of these modifications. The Grand Central yard is very much crowded in all its parts, and there is apparently no remedy except by the purchase of additional land, which would be enormously expensive. A system of elevated store tracks, with hydraulic lifts, would also be very costly, and the use of yards six miles out, as at present, is but a partial remedy. It seems hardly possible that any rearrangement of the relations between the two tenants, or of their respective shares of the present space, can improve matters any. How the waiting room can be relieved by encouraging four train-loads of people to besiege the ticket offices at the same moment any better than by the old plan of starting trains at much longer intervals than at present, is not apparent. The letter hints at delays caused by improvements on the New York Central between Mott Haven and Woodlawn, but there is no evidence, either from statements on the part of the road, or from the complaints which have been made in the newspapers by passengers, that this work is the cause of more than a very small fraction of the delays now suffered. It seems more reasonable to believe that the frequency of the trains, with lack of co-operation between the two occupants of the tracks, are the real reasons. The completion of the third and fourth tracks will of course be a nearly complete remedy for this, although there will still be a half-mile of two-track line at the Harlem River draw bridge, and the delays by the opening of this bridge will be as bad as ever. Aside from this, the running of New York Central accommodation trains immediately in advance of New Haven express trains (all of the New Haven trains are virtually express over this portion of the road) is a practice which apparently might be bettered without waiting for the new tracks.

The permission to run two or three trains daily past the Housatonic crossing at Bridgeport without stopping, which, it will be remembered, was granted the New York, New Haven & Hartford by the Connecticut Railroad Commissioners, has been rescinded. As the crossing is provided with the Saxby & Farmer interlocked home and distant signals, this looks like a backward step. Certainly the overwhelming opinion among railroad men is that the safety of a crossing is not enhanced by stopping trains under circumstances like these. If the real reason for stopping through trains lies in the desire of the city or of the

connecting road (the Housatonic) for increased accommodations the question at issue should be presented fairly upon its merits. The passenger station, which is very small and inconvenient for the business done, is very close to the crossing. When the people using a station are served by a reasonably sufficient number of trains, every additional stoppage is a hindrance to the convenient transaction of business. So far as mere speed is concerned, it is likely that some trains that do stop at Bridgeport endanger passengers more than those which do not. At least it is often so in similar cases. The danger to persons standing near the track is in inverse proportion to the good judgment of the engineman or the weight of his train in proportion to the power of his engine (to get the train over the road in the allotted time). One runner will come to a full stop for the crossing and still run recklessly, while another will keep in motion and yet exercise due care.

The Baltimore & Ohio Report.

For the first time in many years we are given a straightforward account of the condition of the Baltimore & Ohio system. The showing is in some respects good, in others bad. It is good as indicating a desire on the part of the management to deal honestly with the public. It is also good as showing that the condition of things now is better than a year ago, in spite of the unfavorable influences to which railroad traffic has been subject. In both of these respects the report does credit to President Spencer's management. But it shows even more clearly that the condition of the property a year ago was much worse than was supposed at the time. Not merely were the securities overvalued in its balance sheets—so much we all knew—but the apparent earnings of the company were exaggerated by tricks of book-keeping, so as to conceal a real deficit on the year's operations. The results of the present year show some comparative gains, but not a great deal which can be called positively good.

The gross earnings of the whole system for 1887-88 were \$20,353,491, the net income from operations \$5,848,511. Adding other sources of income to the amount of \$1,206,961 we have a total income of \$7,055,472. From this we have to deduct interest rentals and taxes to the amount of \$6,246,553 and preferred stock dividends of \$300,000, leaving a net balance of \$508,919, or not quite 3½ per cent. on the value of the stock.

But this is more than the company has really earned. The "other income" which helps to make it up includes an item of "profit on sales of stocks and bonds" amounting to \$45,784. This, if correctly entered, is not income at all. There is also a much larger item which can only be counted as income through an abandonment of the traditional policy of the company. This item is interest on sinking funds, and amounts to \$358,525. The present report includes this as part of the receipts, and makes no corresponding deduction for expenditures on the same account. The increase in amount due to the sinking fund during the year was \$704,045. Had this been directly met, as was contemplated in the original sinking fund scheme, the company would have been unable to pay any dividend on its second preferred stock, and only a small one on its first preferred. The difficulty was met by an issue of bonds—that is, by borrowing money. We admit that this was wise. The sinking fund requirements were, for the time being, a serious burden on the resources of the company. But we doubt whether it is right to treat interest on sinking funds as income and charge all payments on sinking funds to capital, which is what the present report virtually does. There is nothing dishonest about it, only it is a misuse of language. The sinking fund thus treated is no longer a sinking fund but part of an ordinary funding scheme. If the sinking fund of the Baltimore & Ohio is a sinking fund, the \$358,000 should be deducted from the income balance, as well as the \$45,000 already alluded to. In that case the available income of the company was only seven-tenths of one per cent. on its capital stock. If the sinking fund is not a sinking fund it is best to admit the fact.

Though the apparent net earnings are smaller than last year, the real condition of things is explained as being better. We are sorry to be obliged to say that this change points to special badness last year, rather than to special goodness this year. More than two hundred thousand dollars received from the Central Ohio on capital account were practically credited to income in 1887. Current expenditures on roadway and bridges in 1887 were \$331,000 less than in 1888. Yet the charges in 1888 under the head of maintenance of way and structures were by no means noticea-

bly large. They amounted to only 19 per cent. of total operating expenses and apparently to less than \$1,500 per mile operated. The Erie, which is the system best available for comparison in this respect, operated only 1,610 miles in 1887 against 1821 operated by the Baltimore & Ohio; its charges for maintenance of way were \$3,200,000 against \$2,714,000 for the Baltimore & Ohio. The character of the two systems is such as to make the last comparison a somewhat unfair one; but it will indicate in a general way that the Baltimore & Ohio, under the present management, has simply come up to the standard of good railroad practice in these respects, rather than gone beyond it. What makes this all the more probable is that the company has this year spent nearly \$3,000,000 of capital on construction and equipment account; more than half of it on the main line and immediate branches west of Baltimore.

This increase in construction charges (which undoubtedly represents actual and necessary expenditure) is many times offset by reductions in other parts of the capital account. A revaluation of assets resulted in a subtraction of nearly \$25,000,000 from the nominal surplus of the company. The chief items are: Over valuation of stocks and bonds, \$9,127,000; uncollectible advances to railroad companies, \$7,758,000; equipment depreciations, \$4,000,000. It required no little courage to face the facts clearly, and President Spencer deserves great credit for what he has done. We only wish that he had gone a little farther and made out an itemized table of present book valuations of the different securities which make up the aggregate of \$10,635,000 given in the general balance sheet.

Here again the bad policy of the past is thrown into the clearest relief. It must have dated back a long way. The so-called surplus appears to have been simply a forced profit and loss balance. The re-examinations of assets show an error of nearly a hundred thousand dollars, dating back to 1852 and untouched till the present year. The false valuation of equipment must have run over a long series of years, and have represented a systematic inflation of the apparent earnings of the road.

Other items of capital account show a change for the better. The consolidated mortgage has been used with much judgment. The floating debt of the company, which on Sept. 30, 1887, amounted to \$8,769,000, has now been reduced to \$3,478,000. The report speaks with much hopefulness of the future development of traffic of the system. The statements have given the financial world a favorable impression as to the general outlook for the company, more so, perhaps, than the figures themselves would fully warrant.

October Accidents.

Our record of train accidents in October, given in this number, includes 82 collisions, 58 derailments and 6 other accidents; a total of 146 accidents, in which 120 persons were killed and 223 injured.

These accidents are classified as follows:

COLLISIONS:			
Rear.....	42		
Butting.....	29		
Crossing.....	11		
----- 82			
DERAILMENTS:			
Loose or spread rail.....	3		
Defective switch.....	1		
Broken frog.....	1		
Broken wheel.....	1		
Broken axle.....	3		
Broken car.....	1		
Broken truck.....	1		
Broken steam-pipe.....	1		
Misplaced switch.....	4		
Reckless running.....	1		
Bad loading.....	1		
Cattle on track.....	3		
Landslide.....	1		
Purposely misplaced switch.....	2		
Unexplained.....	34		
----- 58			
OTHER ACCIDENTS:			
Cylinder explosion.....	1		
Miscellaneous.....	5		
----- 6			
Total number of accidents.....	146		

The causes of collisions where given were as follows:

	Rear.	Butting.	Crossing and other.	Total.
Trains breaking in two.....	5	1	1	7
Misplaced switch.....	1	3	1	5
Failure to give or observe signal.....	3	1	2	6
Mistake in giving or understanding orders.....	4	1	1	6
Failure power brake.....	1	1	1	3
Car run out of siding.....	1	1	1	3
Miscellaneous (negligence).....	6	3	1	10
Unexplained.....	28	17	5	48
Total.....	42	29	11	82

A general classification shows:

	Col- lisions.	Derail- ments.	Other.	Total.	P. c.
Defects of road.....	5	2	7	14	11
Defects of equipment.....	7	2	16	25	17
Negligence in operating.....	27	6	33	66	45
Unforeseen obstructions.....	6	2	8	16	11
Unexplained.....	48	34	82	164	112
Total.....	82	58	6	146	100

The number of trains involved is as follows:

	Collisions.	Derailments.	Other.	Total.	P. c.
Passenger.....	32	18	54	104	71
Freight and other.....	127	40	2	169	115
Total.....	159	58	6	223	100

The casualties may be divided as follows:

	Killed.	Collisions.	Derailments.	Other.	Total.	P. c.
Employes.....	29	15	1	45	37	25
Passengers.....	70	2	2	70	74	51
Others.....	3	2	1	5	6	4
Total.....	102	17	1	120	124	86

Thirty-one accidents caused the death of one or more persons, and 40 caused injury but not death, leaving 75 (51 per cent. of the whole) which caused no personal injury worthy of record.

The comparison with October, 1887, shows:

	1888.	1887.
Rear collisions.....	42	35
Butting.....	29	28
Miscellaneous collisions.....	11	1
Derailments.....	58	49
Other accidents.....	6	4
Total.....	146	117
Employes killed.....	45	20
Others.....	75	14
Employes injured.....	120	50
Others.....	103	60
Passenger trains involved.....	54	38

Average per day:

Accidents.....	4.71	3.77
Killed.....	3.87	1.10
Injured.....	7.10	3.52

Average per accident:

Killed.....	0.821	0.291
Injured.....	1.527	0.531

The month furnishes at least eight notable accidents to well loaded passenger trains. One of these (on the 3d) resulted very fortunately, but the others were fatal, except that on the Pennsylvania at East Newark, N. J. Mud Run has been discussed heretofore. The derailment at Washington, Pa., and the collision at Shippensburg, Pa., as well as that between a freight and a work train at Tamanend, Pa., were reported on by a coroner's jury. We give the substance of the verdicts, which are apparently just, as far as they go; though, as in the case of the Mud Run disaster, the juries do not enter at all into the question of the possible negligence of the officers of the road. The citizen is held blameworthy for infractions of statute laws, resulting from his ignorance thereof, even though a direct cause of the ignorance be the burdensome requirements of a careless or unreasonable sovereign, and its removal impossible except by the employment of an astute lawyer at great expense; in like manner these juries seem to blame trainmen for disobedience of a rule without taking a thought as to whether the master issuing it might not have rendered obedience to it much more easy and certain. The responsibility of the master seems too distant and indefinable, and yet no lesson of experience is plainer than that evils are often cured much more readily by attacking such remote causes than by persistent attention to those which are more immediate and apparent. The trainmen involved in the terrible collision at Dickersons, Md., have just been indicted for manslaughter. The derailment at Charleston, W. Va., was clearly malicious, but fire from the baggage car stove appears to have been the cause of the two deaths. This and three other train-accident wrecks were burned up, involving very heavy losses. All the three latter are attributed to oil cars.

One worktrain gang suffered in a collision, forty men being reported "more or less injured;" ten men of another and six of still another were injured in derailments. Either accident would apparently have been averted by a conductor who fully realized the possible dangers involved in transporting several dozen men on open cars. Two or more other worktrains figure in the records. Three freight trains got into trouble by detaching the engines for the purpose of taking water. Some careful superintendents forbid "running ahead for water." Perhaps if all the collisions resulting from the practice were well known others would do likewise. The absence of a rule to destroy or turn in expired time-tables (or failure to follow it) occasioned one of the passenger train collisions of the month, though happily only one passenger suffered seriously. In one rear collision a freight ascending a grade was run into by a light special train. Full particulars are not given but the fact is a commentary on the action of some roads in prescribing a shorter distance on up-grade tracks than on down-grade for flagmen to go back and for fixed signals to be placed. It is often assumed that on a sharp ascent all trains will run slowly, but by a little reflection it will be seen that a powerful engine with a single car—just such a train as officers ride in—may easily attain a speed of 500 per cent. or more faster than that of a heavy freight ahead of it, in many cases. The blame of one collision (8th) is laid upon the conductor's watch, which was some minutes slow. The reporter seems to be content to let all the other watches on the train go scot free. One of the most unusual causes reported this month was that of the derailment at West Cairo, O., on the 28th, where an unhappy steer, in quest of freedom, sacrificed not only himself but hundreds of dollars' worth of other property.

Of the passengers killed four were on a freight train in charge of horses, and three others were lawfully in freight cabooses, this apparently being a regular means of passenger transportation; so that aside from the Mud Run death list there are no deaths of passengers to be charged to the passenger train department. The number of persons killed (120) is the largest for any month on our record except August, 1887, which included the Chatsworth disaster. No other

monthly record comes up to 100. Two trainmen were killed and three injured by the explosion of a locomotive boiler on the Philadelphia & Reading at Glen Carbon, Pa., on the 29d, but it was not a train accident and so is not included in the list. Neither is that at Kansas City on the 24th, where five men were loading a car with hay presses in the Missouri Pacific yards when a freight train backed against the car with such violence as to cause one of the machines to topple over and bury all the workmen. Two were fatally and a third dangerously injured.

An Example of State Control of Railroad Building.

The refusal of a state to permit the building of a new railroad is an event of sufficient rarity to demand more than a passing notice, and we therefore give herewith an abstract of the decision of the Railroad Commissioners of Massachusetts on the applications for certificates of exigency filed by the Old Colony road and by an association proposing to organize a new company under the name of the North Attleboro & Wrentham, which were briefly noted in our news columns last week. It appears that the two petitions were presented about the same time and they are considered in one report.

The Board is satisfied that public convenience and necessity does not require the granting of a certificate on both petitions. There is no provision in the law for the guidance of the Board in the event of conflicting petitions being presented, but as one of the chief reasons for the passage of the present law was undoubtedly the desire to prevent the building of parallel roads, it is assumed that the law will be best carried out in this case by the selection and approval of the better route. Both of the proposed routes have one terminus in the town of Walpole. The route of the Old Colony connects with its New Bedford-Fitchburg line, connecting with the Boston & Albany at South Framingham; the other connects with the New York & New England at a point south of Walpole junction. It is probable that either petitioner could adopt such route through Wrentham as would be satisfactory to the selectmen. The route of the Old Colony terminates at the station of the North Attleboro branch in that town, while the other passes west of the business centre of the town of North Attleboro, and makes connection at Adamsdale with the New York & New England. For all towns and all interests north of Attleboro, one route is practically as good as the other; but in going to Providence the route via Adamsdale would be 4 miles the shorter. The travel to Providence is the most important factor in the problem, so far as passenger traffic is concerned. In support of the North Attleboro & Wrentham petition it is urged that North Attleboro will secure the benefit of a competing line to Providence. The Board gives this consideration great weight, especially as all important interests in that town, except stockholders in the present North Attleboro branch, operated by the Old Colony, are in favor of this petition; but the line of the North Attleboro & Wrentham south of North Attleboro would virtually constitute a 4 mile section, costing \$100,000, which would have to be built solely for the purpose of affording this competition. So far as freight is concerned the difference in distance would be immaterial. The arguments adduced in favor of the new line for general passenger traffic are considered insufficient to justify the construction of 4 miles of road. The Board believes that the claim that existing accommodations and facilities at North Attleboro are inadequate is not proved; neither are the present freight and passenger rates unreasonable. If North Attleboro were suffering it might seek a remedy by building a competing line, but the public would somehow have to pay the expenses of both lines, or else some of the investors suffer loss. Generally, such a line ought not to be built unless business is likely soon to increase enough to pay a fair profit on both roads. It is not probable that such is the case in this instance. The new road, operated independently, cannot for many years pay. The North Attleboro branch was built by public-spirited citizens for the benefit of the town, and they deserve consideration. The lease of this branch road to the Old Colony runs twelve years more, and the stockholders receive rent, but if a competing line to Providence is built the value of their lease will eventually be seriously impaired. The Old Colony bills freight through to New York and Western points at Boston rates. The North Attleboro & Wrentham, even with the advantage of the most favorable relations with the New York & New England, could secure no better facilities or rates than the Old Colony now furnishes. The new company proposes to make its capital \$250,000. It can lawfully issue a similar amount of bonds, but the estimates show that the cost of road and equipment will probably exceed \$538,000. Possibly more stock subscriptions could be secured, but it is plain that the projectors do not fully appreciate the extent of the undertaking before them. The Old Colony can borrow at 4 per cent., whereas the new company would probably have to pay higher. Probably the Old Colony could build a line from 10 to 20 per cent. less than could an independent corporation. For these reasons the Old Colony petition is granted and the other rejected.

The line accepted has no crossings of highways at grade, while the other has a few of unimportant roads. Aside from this the decision as between the two petitions seems to be based simply on the ground that a road to serve a new district is allowable while one simply to provide a competing route should not be tolerated without a greater necessity being shown. Even as the case stands the action of the Commissioners leans on the side of the public, if it leans either way, for the new line serves a thinly settled region, and is only a few miles distant from existing lines of the New York & New England and the Old Colony; there can therefore be little prospect of much profit in its opera-

tion for some time. Assuming that the independent company hopes to lease its road to the New York & New England, the rival of the Old Colony, it may be said that the Commissioners, on request of two competing companies to enter a certain district, decides in favor of that one which can build and operate the road the cheapest. The present case may, indeed, almost be called a miniature exhibition, as the length of road, the importance of the community to be served and the financial interests involved are very small as compared with the instances usually in the public mind; but it serves as an illustration of a good law fairly executed. It suggests a direction in which state control may eventually operate for the good of shareholders and of the general public alike.

Annual Reports.

Baltimore & Ohio.—The results for the year ending Sept. 30, 1888, are as follows:

Earnings.	
Freights.....	\$14,309,773
Passengers.....	4,262,330
Total, including miscellaneous.....	\$20,353,491
Operating Expenses.	
General.....	\$1,193,123
Transportation.....	6,931,793
Equipment.....	3,361,425
Maintenance of way.....	2,714,218
Total expenses.....	14,200,561
Net earnings from operation.....	\$6,152,930
Deduct net earnings from Washington Branch.....	304,419
Income from other sources.....	\$5,848,511
Interest, rentals, taxes.....	1,206,960
Total income.....	\$7,055,471
Balance.....	6,246,553
Dividend on first preferred stock, at 6 per cent.....	\$180,000
Dividend on second preferred stock, at 6 per cent.....	120,000
Remainder.....	\$508,918

For the year previous the gross earnings were \$20,659,036; operating expenses, \$14,120,131; net earnings, \$6,538,905. But no fair conclusions can be drawn from these figures, because they included, in 1887, operations of express and sleeping car systems. Franchises are now held on different terms.

Detailed statistics of traffic and rates are not given in this report. The few selected facts reported are worth little for statistical purposes.

The general balance sheet, much condensed, is as follows:

Assets.	
Road and equipment.....	\$58,412,397
Cost of other roads.....	8,095,119
B. & O. car trust.....	2,500,000
Sinking funds, etc.....	10,838,954
Securities held by trustees.....	31,000,187
Bonds and stocks owned.....	10,635,445
Advances to leased lines.....	1,322,702
Current assets.....	5,175,339
Cash.....	533,608
Total.....	\$128,573,461
Liabilities.	
Stock, Preferred.....	\$5,000,000
Common.....	14,792,506
Capitalized ground rent liens.....	\$19,792,566
Bonds, Mortgage.....	689,042
Mortgage and collateral.....	31,001,000
Collateral.....	20,708,000
Assumed by company.....	22,994,000
Due sinking funds.....	680,000
Floating debt.....	275,240
Current debt.....	3,478,211
Profit and loss.....	5,142,796
Total.....	23,812,606

As regards the development of local traffic, substantial progress has been made during the year. The company has inaugurated an immigration bureau under the direction of the traffic department, the sole duty of which is to invite settlers and manufacturers to the company's lines, point out the advantages of its undeveloped but attractive territory, and, where necessary, to visit the localities with the parties searching for homes, manufacturing sites or other properties. Those portions of West Virginia immediately contiguous to the company's lines show marked indications of vigorous growth, and there are under way several small lines of railroad which will be feeders to the system, notably extensions of the existing lines south of Clarksburg, Weston and Buckhannon, into the rich timber and mineral regions to the south. Also one through the rich coal field (probably the richest in the state of West Virginia) lying in the valley of the Monongahela River, between Fairmont and Clarksburg, at both of which points the line will connect with the Baltimore & Ohio. The value of this coal for steam purposes, as well as for coke, is now well demonstrated. The output from the ovens on the Fairmont, Morgantown & Pittsburgh Branch, using the same vein of coal, has been for the year 67,834 tons, as against 2,423 tons during the year previous.

The year has been marked by the further development of the export and import trade through the port of Baltimore in connection with the various steamship lines landing at the docks of the company. Messrs. William Johnston & Co., of Liverpool, have opened a line between Locust Point and London, by which the company secures its proportion of the large flour and miscellaneous trade to and from that port. This is in addition to the one between Baltimore and Liverpool which has been operated for several years by this firm. They now have under construction, to be ready in the Spring of 1889, three of the largest and most modern and complete cargo steamers of 6,000 tons capacity each. These steamships will be the finest of their character in the North

Atlantic trade, drawing 26 feet of water and plying in and out of the port of Baltimore, will demonstrate the wisdom of the deepening of the channel to this port to the full depth of 27 feet. They will land regularly at the company's docks without reference to the stage of the tide, and will receive and discharge their cargoes alongside the cars of the company.

The legislature of Maryland, at its session in 1888, repealed the charter of the Baltimore & Ohio Employees Relief Association, the repeal to take effect on April 1, 1889. The company will continue the association after the date named, and has now a programme under consideration with this object in view. The active membership at the close of the fiscal year was 20,267, being a decrease of 1888 as compared with the corresponding period of the previous year.

The receipts and income during the year have been... \$359,278
And the disbursements have been... 358,982
From the date of the inauguration of the association until the close of the fiscal year the disbursements have been... 2,075,519
The amount due depositors by the savings and building feature was:

At the close of the fiscal year of 1887..... 441,801
The amount due depositors Sept. 30, 1888, was..... 446,991
The withdrawals by depositors during the year have been..... 161,006
The deposits during the year have been..... 106,194
The amount due by borrowers at the close of the fiscal year of 1887 was..... 331,677
The amount due by borrowers at the close of the fiscal year of 1888 was..... 332,384
The funds of the savings feature are loaned to employees of the company, to enable them to build or purchase homesteads.

At the close of the fiscal year there were 154 names on the pension roll, the disbursements on this account for the year having been \$23,438.11.

Further remarks on this report will be found in our editorial columns.

New York, Lake Erie & Western.—Operations for the year ending Sept. 30, 1888, were as follows. The operations include the New York, Pennsylvania & Ohio and all other leased lines:

	1888.	1887.	Inc. or Dec.
			P. c.
Miles operated.....	1,612.5	1,612.5	
General freight.....	\$12,212,633	\$13,304,402	D. 8.21
Coal.....	8,290,099	6,846,342	I. 20.94
Passenger.....	5,247,853	5,195,841	I. 1.00
Mail.....	264,381	265,606	D. 0.41
Expenses.....	566,727	455,469	I. 24.43
Miscellaneous.....	636,286	500,139	I. 27.22
Total.....	\$27,217,990	\$26,567,850	I. 2.45
Proportion due leased lines.....	2,385,170	2,357,501	
Accruing to Erie proper.....	24,832,820	24,210,348	I. 2.57
Working Expenses:			
Conducting transportation.....	\$7,263,734	\$7,128,049	I. 1.90
Motive power.....	5,607,325	4,773,365	I. 17.47
Maintenance of cars.....	1,818,748	1,817,084	I. 0.09
Maintenance of way.....	2,843,142	3,200,873	D. 11.17
General expenses.....	470,520	471,498	D. 0.11
Total.....	\$18,003,409	\$17,390,673	I. 3.52
Net earnings.....	6,829,350	6,819,685	I. 0.14
From other sources.....	957,841	940,658	D. 0.30
Total.....	\$7,787,191	\$7,760,343	I. 0.09
Interest, rentals, etc.....	7,028,348	7,158,544	D. 1.82
Surplus.....	\$738,843	\$601,799	I. 22.80
Per cent. of operating expenses.....	66.115	65.458	I. 1.05

The operations of the Erie proper, including leased and operated lines and excluding the New York, Pennsylvania & Ohio, were:

	1888.	1887.	Inc. or Dec.
			P. c.
Miles operated.....	1,036	1,036	
General freight.....	\$8,642,471	\$9,565,911	D. 9.65
Coal.....	7,178,739	5,784,224	I. 24.11
Passenger.....	3,808,391	3,862,246	D. 1.39
Mail.....	196,434	198,562	D. 1.07
Expenses.....	451,698	363,800	I. 24.16
Miscellaneous.....	562,291	427,990	I. 31.38
Total.....	\$20,840,022	\$20,202,731	I. 3.15
Per mile.....	20,121	19,509	
Expenses:			
Conducting transportation.....	\$5,434,157	\$5,390,594	I. 0.80
Motive power.....	4,004,655	3,337,301	I. 18.52
Maintenance of way.....	2,032,036	2,516,854	D. 19.25
Maintenance of cars.....	1,475,307	1,452,230	I. 1.59
General.....	427,310	44,367	D. 3.61
Total.....	\$13,371,466	\$13,180,672	I. 1.45
Per mile.....	12,910	12,726	
Net earnings.....	7,468,557	7,022,060	I. 6.35
Per mile.....	7,211	6,780	

The tons of general freight carried during the year was 4,075,000, being a loss of 3.58 per cent. from 1887. On this traffic the earnings per ton mile were 0.803 cent, being an increase over 1887 of .018 cent. The coal tonnage for the year, including anthracite, bituminous and coke, was 10,199,000 tons, an increase of 1,490,000 tons, and about 170,000,000 ton miles over 1887. The earnings per ton mile on this traffic also increased from .039 to 0.611. The coal tonnage for the year 1888 was nearly equal to the entire tonnage of freight and coal of the line in 1885.

The total number of passengers carried in 1888 increased to 8,544,000, as against 6,866,000 in 1887, but the earnings per passenger mile were less than last year, having been 1.777 in 1888, instead of 1.939 in 1887. The through passengers decreased as well as the rate per mile, but the number of local passengers increased to 8,165,000, or 27.81 per cent. The average haul per passenger decreased from 27½ to 25 miles, which is owing in a great degree to the large increase in commutation business.

The operations of the New York, Pennsylvania & Ohio showed a small increase in gross earnings, but a net loss in operating that line of \$343,912. The President attributes this loss partly to the increased expenditures required to restore track and equipment from former depreciations, partly to "the original temporary construction," and says that, to a great extent, the unsatisfactory result is due to operations of the Inter-state Commerce law, under which competition as to rates has given place, to a certain

extent, to a competition of facilities. Under such competition the N. Y., P. & O., by reason of its high grades, limited equipment and insufficient sidings, is not well fitted to cope with its rivals; and yet, under the operations of the lease, the Erie Company is expected to forward by this line a very large proportion of its tonnage. The lease, therefore, has become more onerous than under the old conditions, and even in 1883, when the business of the line was prosperous, the lease was an improvident one. The President says that, should it be impossible to secure a modification of the lease, it is a grave question what action the Erie directors should take, but that no action should be taken until the whole matter is thoroughly investigated.

The earnings from the express business under the new contract with Wells, Fargo & Co. were the largest, from this source, in the company's history. The deduction drawn from this, however, is not that railroad companies cannot manage their own express business as well and as profitably as express companies can, but the result is attributed to the fact that Wells, Fargo & Co. could bring an immense additional business, from an extensive and comprehensive system, over the Erie lines.

During the year 11 locomotives were bought and 20 built at the company's shops, at a cost in all of about \$280,000, and the company has continued to increase the number of its anthracite coal burning passenger engines, there being now in operation 65. Considerable additions have been made to the equipment of freight and passenger cars also.

The expenditures for maintenance of way were diminished 19.26 per cent. These expenditures have been extraordinary for the two previous years, and it is believed that the results of putting in heavier rails, stone ballast, improved switches and frogs, and other important improvements, are now beginning to be felt in economy in this item.

Recent dispatches from San Francisco announce the arrival of Chinese journals with the news of the official opening of the first railroad in China. As the Kaiping Railroad, 7 miles, was built in 1880 and has been worked ever since, and as the road to Lutai, 21 miles, was opened in May, 1887, and has since been operated very successfully, there is evidently some mistake in this announcement. The lines from Lutai to Taku, 28½ miles, and from Taku to Tientsin, 30 miles, were authorized in 1887, and the section to Taku was completed in that year. The line to Tientsin was reported open two or three months ago. This is the road now said to have been officially opened by Viceroy Li. Viceroy Lie opens a good many roads in the United States every year, but it seems remarkable that he should begin his work so early in the railroad history of China. Perhaps this is the Chinese name of Count Mitkiewicz. What gives these stories about Chinese railroads their significance and secures for them such prompt and wide circulation, is the notion that at any time that empire may suddenly open up a wide field for railroad building. This idea is not, however, entertained by those who have studied the matter carefully on the ground. General Wilson, who went to China for the express purpose of ascertaining what opportunity the country offered for railroad builders, said, on his return, that although some of the most powerful advisers of the throne are in favor of building railroads, they will not borrow money for the purpose, nor will they grant subsidies or concessions to foreigners; but that they will build railroads and other public works when they are shown that this can be done by their own money and their own labor. The English officials of the company operating the existing lines are even less sanguine than General Wilson of any immediate great extension of the railroad lines of China. They realize, probably more fully than he does, the power of the resistance offered by the aristocratic classes.

An item has recently been going the rounds of the papers that the Baltimore & Ohio passenger conductors make regular continuous trips of 479 miles between Chicago and Wheeling, W. Va. It appears that the actual distance is 468 miles, and the trip is made only by the conductors of the fast trains, which cover the distance in about 14 hours. Each trip is followed by a rest of 36 hours, so that the trying effect on the men is not particularly severe. Fourteen hours in a passenger train which stops only at long intervals is not hard work to one who is used to it, and yet there can be little doubt that a run of this length is an uneconomical one. In the first place 36 hours' rest in one stretch is not natural; any one who can afford such protracted idleness as that should go to work for his poor neighbors. A well-known and experienced superintendent lately said that he deemed it of the utmost importance that trainmen know the road thoroughly. It is doubtful if men who traverse nearly 1,000 miles in a round trip can do this. A passenger conductor can get over a road that he hardly knows at all, but the superintendent who habitually sends out trains in charge of two men, of whom only one is really acquainted with the road, should ask himself whether the officer above quoted is not more nearly right than himself. If there were important advantages connected with long runs the disadvantages might not unreasonably be put up with, perhaps. But if the only benefit is a slight saving on the pay roll, it may be questioned whether the same saving could not be better effected in some other way. With long runs a specified train service can be run with a smaller force, as the regular men, when taking their long rests, may be depended upon to a considerable extent for extra service, instead of maintaining supernumeraries; but this is partially offset by the disadvantage of having the men so far away from home. A Wheeling man in Chicago is worth very little for anything but his regular run. For an extra trip at that end of the road he would

resulting be at a considerable disadvantage. Collisions resulting from too much dependence of one of the custodians of a train upon the other happen in the passenger service as well as in the freight, and the possibility of the occurrence of such is not so remote as to be safely ignored. The management should take care not to afford the least excuse for such dangerous shifting of responsibility.

Work has begun on the foundation of the west shore pier of the great Memphis bridge, which, after the Forth bridge, is to have the longest spans of any trussed bridge in the world. The spans are to be from centre to centre of piers, beginning at the west, 621 ft. 6 in., 621 ft. 4 in., 791 ft. and 170 ft. The longest span will consist of two cantilever arms and a connecting truss with parallel chords. It is a through bridge, and wide enough for double track. The clearance above high water is 75 ft. The plans of the bridge have been approved by the Secretary of War, and the Kansas City & Memphis Railway & Bridge Co. has been organized to build it. Mr. G. H. Nettleton is President of this company, Mr. George S. Morison Chief Engineer and Mr. Alfred Noble Resident Engineer. The work now in hand is the foundation of one shore pier, and on the developments of this work will depend to some degree the designs for the foundations of the other piers. No other work than this one foundation will be undertaken at present, and no contracts are let. There is no rock in position, and all foundations must be in clay.

The Railroad Commissioners of Kansas lately reminded a complaining shipper that he was getting two and a half times as much pay for his services in the transaction cited as was received by the railroad company, which transported the goods 175 miles. It appears that the complaint concerned the freight rate on apples, of which the complainant was a buyer, and he felt especially aggrieved that grain and coal were carried at rates so much cheaper than those accorded his commodity. But he acknowledged that his own profit on the apples in question was 40 cents per bushel, while the road received only 16 cents gross. The Commissioners reminded him that dealers in corn and wheat generally made less than 5 cents per bushel. This, no doubt, astonished the oppressed merchant.

TECHNICAL.

Locomotive Building.

The Denver & Rio Grande will soon receive 12 large freight locomotives from the Baldwin Works of Philadelphia.

The Rhode Island Locomotive Works will deliver to the Western & Atlantic, this month, two new locomotives. Completing the order for three.

The St. Louis, Vandalia & Terre Haute will soon build two switching locomotives at its own shops, and also two freight locomotives.

The Chesapeake & Ohio has ordered recently four locomotives from the Schenectady Locomotive Works, ten from the Cooke Locomotive Works, and will place orders shortly for others.

The Louisville, New Albany & Chicago has in the last few months received nine freight locomotives. Four were built at the Rogers Locomotive Works and five at the Rhode Island Locomotive Works.

Car Notes.

The Wabash is asking bids for 1,000 box cars.

The Milwaukee, Lake Shore & Western is asking bids for 500 box cars.

The Chesapeake & Ohio is having built 1,000 cars, 800 coal and 200 platform, at the Indianapolis Car & Mfg. Co.'s works. The company has completed its contract to build 2,850 coal and 650 box cars of 60,000 lbs. capacity for the Atchison, Topeka & Santa Fe.

The Kansas City, Memphis & Birmingham has now received over 100 of the gondola cars recently ordered of the Barney & Smith Mfg. Co., of Dayton, O. New cars are being delivered to the road almost daily.

The order let by the Old Colony last week to the Wason Mfg. Co., of Brightwood, Mass., for 30 passenger cars, does not include the two parlor cars, for which the road is still in the market.

Bridge Notes.

The Commissioners of Marion County, Ind., have let the contract for building the superstructure of the bridge over Pleasant Run to the Pittsburgh Bridge Co. The total cost of the bridge will be about \$40,000.

Proposals for the construction of the Hawk street viaduct at Albany, N. Y., have been received from the Boston Bridge Works, Boston, Mass.; Wallis Iron Works and Post & McCord, New York; New Jersey Steel & Iron Co., Trenton, N. J.; Edge Moor Iron Co., Wilmington, Del.; Gorton Bridge Co., Gorton, N. Y.; Hilton Bridge Co., Albany, N. Y.; King Iron Bridge & Manufacturing Co., Cleveland, O.; Penn Bridge Co., Beaver Falls, Pa.; Rochester Bridge Co., Rochester, N. Y.; Mt. Vernon Bridge Co., Mt. Vernon, O.

Bids for a bridge across Cottonwood Creek, in Tehama County, Cal., were as follows: San Francisco Bridge Co., \$1,147; American Bridge Co., \$1,223; Pacific Bridge Co., \$1,249. Contract was awarded to the San Francisco Bridge Co. for a Pratt combination bridge.

The new iron bridge at the Lancaster mills, near Clinton, Mass., is nearing completion.

Work has been begun on the construction of the new iron bridges near Centreville, Mass., by the King Iron Bridge Co.

The City Solicitor of Toronto, Can., has had drawn plans for two bridges over Dundas street, to cost \$20,000 each.

J. E. Bradford has been awarded the contract to build a bridge over the Providence & Worcester tracks at Noonsocket, R. I.

The county supervisors will erect a bridge over Indian Creek, in Council Bluffs, Ia.

The Dominion Bridge Co., of Lachine, Que., has a contract from the Drummond County Railroad for the construction of two bridges over branches of the Nicolet River, near St. Leonard, P. Q. One bridge will have 160 ft. through span, 34 ft. above the river, and the other will have three 110 ft. deck spans, and 280 ft. of girder spans of 30 to 60 ft. each,

supported on steel trestle work, about 75 ft. above the river. The cost of the two bridges will be about \$65,000.

The Housatonic will erect three new iron bridges at Pittsfield, Mass., in the spring. The contracts will be let this winter.

The McKeesport & Monongahela Bridge Co. has been chartered to construct a bridge over the Monongahela River from McKeesport to a point in Mifflin Township opposite. The incorporators are: S. P. White, J. B. Findley, Josiah Speer and J. B. Mitchell.

The following bids have been received for building a bridge over Beaver Creek, near Yankton, Dak.: Sioux City Construction Co., of Sioux City, \$3,250; Milwaukee Bridge & Iron Works, Milwaukee, \$795; King Bridge Co., Cleveland, Ohio, \$885; Minneapolis Bridge Co., Minneapolis, Minn., \$865; Wrought Iron Bridge Co., Canton, Ohio, \$895. The contract was awarded to the latter company.

The Charleston Bridge Co. has been organized in West Virginia to construct a toll bridge across the Kanawha River at Charleston. The capital stock is \$50,000 with the privilege of increasing to \$250,000. The stockholders are B. L. Wood, Jr., and J. V. Hoag, Jr., of Pittsburgh; R. S. Carr and S. M. Snyder, of Charleston.

A new iron bridge is being built across Mad River, at West Winsted, Conn.

Work on the new bridge at Waltham, Mass., is being pushed forward rapidly.

Proposals for the construction of the viaduct at South Omaha, Neb., received by the City Council were as follows: New Jersey Iron & Steel Co., for steel spans and trusses, \$25,000; for wooden trestles, \$16,000; total, \$41,000. Sioux City Construction Co., trusses, \$29,370; bridge and trestle work, \$43,766; Kansas City Bridge & Iron Co., iron trusses, \$28,770; steel, \$31,000; total steel and wood, \$45,780; for wood and iron, \$44,990. C. A. Hubbard, Omaha, three steel truss spans, \$15,800; viaduct complete, \$33,390, including iron cylinders for support. Minneapolis Bridge Co., for iron trusses, with tabular piers, \$43,500; wood and iron, \$38,500. Wrought Iron Bridge Co., Canton, O., iron truss, \$45,000. J. H. Sparks, Omaha, steel trestle and viaduct complete, \$43,000. Phoenix Bridge Co., Kansas City, steel trusses, \$13,000; complete, \$45,000. St. Louis Bridge & Iron Co., viaduct with three spans, \$23,760. Templeton & Morrow, Omaha, steel and iron spans, \$38,838. King Iron Bridge Co., Cleveland, O., three wrought iron trusses, \$26,350; total, \$41,350. P. E. Lane, Chicago, three spans of iron and steel, \$28,880; total, \$43,332. Milwaukee Bridge & Iron Works, three steel spans \$29,490; iron, \$28,499; total, steel and wood, \$43,498; total, iron and wood, \$42,498.

Manufacturing and Business.

As the result of negotiations which have been pending for some time, the firm of Fairbanks, Morse & Co., Chicago, have, in addition to their already large line of goods, become general agents for the following: Eclipse Wind Engine & Pump Co., Smith-Vaile Pump Co., Sheffield Velocipede Co., the Dodge stand pipe, the Barrett track jack and others. The firm has placed a number of new salesmen in the field, and will make a specialty of the railroad trade of the entire country.

The Chapman Valve Manufacturing Co., of Indian Orchard, Mass., is at work on a large order of hydrants for the government, to be used at the Charleston Navy Yard. These valves have a separate valve for each hose nozzle. The company is crowded with orders from all parts of the country, and from England, Australia and Switzerland, and the works are being run at their full capacity. The addition to the iron foundry, 60 x 60 ft., recently completed, gives needed room in other departments, and will increase the capacity of the foundry over 10 per cent.

The Minnesota Car Co. has let the contract to McLean & Crawford, of St. Paul, for all the castings needed at the car works at Duluth before the company's own foundry is able to run—about 40 tons in all. The contract has also been let to Allis & Co., of Milwaukee, for engines, and to other firms for steam cranes and other parts of the machinery.

Joseph Rogan, for many years identified with the railroad supply trade in the West, has been appointed agent of the Baker Heater Co., with office in the Phoenix Building, Chicago.

The Hazleton Iron Works, at Hazleton, Pa., has recently purchased and put in operation the plant of the Minersville Iron Works, at Minersville, Pa. The plant is composed of a machine shop 155 ft. x 70 ft., a foundry 70 x 80 ft., a forge 150 x 50 ft., and a boiler shop 70 x 35 ft. The works will be run on furnace machinery, castings, rolling mill machinery, mine locomotives, mine pumps, hoisting engines and steam shovels, and all kinds of mine machinery and castings with structural work and forgings. Employment will be given to about 150 men.

The extensive works of the Fort Wayne Jenney Electric Light Company at Fort Wayne, Ind., were destroyed by fire, Nov. 23. The costly are machinery, the engines, the incandescent department, and the Star Iron Tower Co., are a total loss, the value of which is estimated at \$300,000.

W. C. Jones, late Superintendent of the Universal Radial Drill Co., of Cincinnati, and W. S. Rogers, formerly consulting engineer for the same firm, have opened an office in Cleveland, O., as mechanical engineers. They will make a specialty of designing and building special machinery and machine tools. Messrs Jones & Rogers were the inventors and constructors of the universal thread-chasing device and gearing that attracted much attention at the late Cincinnati exposition.

The foundry and machine department of the Harrisburg Car Mfg. Co., of Harrisburg, Pa., report a large number of sales within the last six weeks. Among these the Ide engine takes a prominent place, the sizes which were sold ranging from 30 to 150 horse-power. Gas plants, Weitmyer furnace settings and ordinary tubular boilers also are well represented in the list of sales.

The Mason Regulator Co., of Boston, has, within the last month, been running night and day to fill orders for locomotive reducing valves, and has now enough orders to keep the works busy the coming two months.

The Davis Spring Plate Co., of Wilmington, Del., has received during the past month contracts for the plates for over 15,000 cars, and in addition have orders on hand sufficient to keep the works running on full time until next June.

The Eames Vacuum Brake Co., of Boston, is equipping several eight-wheel moguls on the Delaware division of the New York, Lake Erie & Western, with the company's driver brake.

The wood-working shops of the Burton Stock Car Co.'s works at Wichita, Kan., is equipped with a 220 h. p. engine built by the Fitchburg Steam Engine Co., and other machinery, and the Thomson-Houston electric light plant. The blacksmith and machine shops are equipped with 20 forges, one Bement & Miles double shear, one 500-lb. Bradley trip hammer, a bolt furnace and bolt-cutting machine and a furnace for shaping iron, built by Williams, White & Co., of

Moline, Ill., a horizontal drill, double-acting Bement & Miles lathe, together with the usual lathes, planers and punches, most of which were made by Bement & Miles. No foundry work, either in iron or brass, has yet been done, but these departments will probably be in operation by January. The force employed at present numbers 175 men, which will soon be enlarged. The capacity of the works is now 10 cars per day. Refrigerator cars are to be added to the line now made, and probably street cars will be undertaken later.

The following bids for a union freight depot, 48 x 800 ft., at Portland, Or., were received: L. C. Shorno, \$25,390; E. A. Webster, \$28,200; Wm. Jacobson, \$24,500; N. J. Blagen, \$30,300; Ball & Co., \$28,000; Blakely & Co., \$25,877; T. Jones, \$22,700; John Bridger, \$22,199; Thos. Dauson, \$23,900; Rayer & Starkey, \$22,800; T. Walker, \$23,500; P. Hobkirk, \$26,757; Hoffman & Bates, \$24,200.

The Canadian Pacific will probably establish a foundry at Brownville, Me., for the manufacture of car wheels. The iron produced at the Kahtadin Iron Works has special qualities which make it desirable for car wheels, and it has been used for that purpose very extensively for years.

The Thomson-Houston Electric Co. reports the following new business in arc lights: Chattanooga, Tenn., 200; Findlay, Ohio, 185; Wood, Brown & Co., Philadelphia, Pa., 60; Young, Smith & Co., Philadelphia, Pa., 60; Ensley, Ala., 35; and the following increases: Johnstown, N. Y., 50; Columbus, Ohio, 100; Worcester, Mass., 35 arc and 800 incandescent; East River Co., N. Y. City, 100 arc and 1,000 incandescent; Toledo, Ohio, 100; Mobile, Ala., 85; Waltham, Mass., 50; Atlanta, Ga., 50; Hyde Park, Mass., 50; Buffalo, N. Y., 800 incandescent; Rome, N. Y., 50; Somerville, Mass., 50; Waterville, Conn., 500 incandescent; Malden, Mass., 500 incandescent. The company has also received several smaller orders, aggregating 245 arc lights.

Iron and Steel.

The company organized by Abraham Reese, of Pittsburgh, Pa., referred to last week, will roll old steel rails into smaller rails under patents secured by Mr. Reese. The company will also manufacture splice bars and bolts for small rails, as well as spikes of proper sizes for small rails. The company has been organized in Chicago, Ill., and will erect a plant to utilize the invention. The company is composed of Abraham Reese, Harry Reese, William Haslage and Thomas W. Davis, of Pittsburgh, and five capitalists of Chicago. The capital stock is \$20,000, all of which is paid up. The site selected for the new plant is at Hartford City, Blackford County, Ind., located 167 miles east of Chicago. As an inducement to locate the new plant in that place the authorities offered 100 acres of ground in fee simple, which includes a natural gas well with 350 lbs. pressure. Work will be commenced at once on the main building, which will be 80 x 160 ft.

The Ohio & Western Coal & Iron Co. has now one of its new furnaces, at Floodwood, Ohio, in blast. Coke is used for fuel and the ores are a mixture of Lake Superior and native. The two furnaces at this place are 75 ft. high and 17 ft. in diameter at bosh, and have four Mackintosh & Hemphill blast engines, with 48 x 84 in. blowing cylinders. One furnace is equipped with fire-brick stoves and the other with iron-pipe stoves. The furnace constructors guarantee a daily output of 125 tons. The company also owns two other furnaces in Ohio. The four stacks combined will have a capacity of 300 to 350 tons of pig-iron daily. Pickands, Brown & Co., of Chicago, and Pickands, Mather & Co., of Cleveland, O., are agents for the sale of the product.

The Prospect Rolling Mill Co., of Cleveland, O., was organized last Summer, with L. Levi, Treasurer; A. A. Fuller, Secretary and Manager; W. F. Loyd, Superintendent. The company will make merchant bar iron, and is putting in six puddling furnaces. These are running double turn, and make 40 tons finished iron per day.

The Bethlehem Steel Co., of Bethlehem, Pa., has the contract for supplying the forgings for the eight, ten and twelve inch guns for the navy. The recently erected steel plant cost over \$1,000,000, and now that it is in running order it is expected that the forgings will be sent at once to the Washington Gun Foundry, where the guns will be constructed.

E. E. Robinson has been appointed Superintendent of the Hudson Steel and Manufacturing Co., of Birmingham, Ala. The 32-in. beam mill of Carnegie, Phipps & Co., Limited, at Homestead, Pa., has been placed on single turn and will remain so until enough orders are received to place in on double-turn.

The new blast furnace of the Moorhead-McCleane Co., of Pittsburgh, has been put in blast. This furnace was erected to take the place of their old furnace, and will turn out about 200 tons of pig iron per day.

M. V. Smith, metallurgical engineer, of Pittsburgh, is placing a number of his gas-producers in the works of the Hartman Steel Co., Limited, at Beaver Falls, Pa. When the producers are completed the firm will manufacture fuel gas and will give up entirely the use of natural gas.

General Manager Bradbury, of the Lake Erie & Western, has awarded the contract for 4,000 tons of steel rails to the Joliet Steel Works, of Joliet, Ill., to be delivered at the rate of 1,000 tons a month, commencing next March.

The Calera Furnace Co., of Calera, Ala., will reorganize and go into full operation at an early day. Dr. Pierce, the General Manager, is organizing a new plant at Murphy, Ga.

Oliver Bros. & Phillips are gradually changing their furnaces at the South Tenth street mill, Pittsburgh, to make them like the puddling furnaces in their Allegheny plant. This is part of a change from high to low pressure in the use of gas. The dimensions of the pipes will be increased.

The Catocin Mountain Iron Co. has been organized by Thomas Gorsuch, G. Houck, Geo. E. Shipley and D. O. Bradley, of New York, and others. The capital stock is \$90,000. Thomas Gorsuch is President; L. R. Waesche, Secretary and Manager, and George Houck, Treasurer. The company has bought the furnaces at Catocin, Md., which have a daily output of between 30 and 40 tons.

No. 6 furnace of the Crane Iron Co., at Catsaqua, Pa., is now in blast after an idleness of several months, during which time it has undergone thorough repairs.

The Louisville & Nashville will shortly place orders for a large rail contract.

The Rail Market.

Steel Rails.—Little or no business is reported in the East. Sharp competition between a Pittsburgh and a Chicago mill over business aggregating 30,000 tons is reported. It is difficult to ascertain at what prices orders have been taken, but it is generally believed orders have been taken at less than \$26 at mill. The quotations in the East are \$27@28.

Old Rails.—No transactions are reported, except a lot of 2,000 foreign tees to arrive in New York and sold to an Eastern mill at \$23.50 ex ship.

Track Fastenings.—The market for spikes is active at \$2.20@2.25 delivered. An order for angle bars at Fort Worth, Tex., was taken at \$2.05.

Car Heating Notes.

The State Railroad Commission of Minnesota is arranging a series of questions relating to car heating, to be sent out in a circular to the Railroad Commissions of the different

states. The Commissioners intend to place the matter in such shape before the Legislature that whatever action it may take will be with a full understanding of what has been done toward heating cars safely in this country, and the responsibility for such action, when taken, will rest with the Legislature and not with the Commission.

The New York & Northern has adopted the Gold storage system and expects to have all passenger stock equipped this winter. Over 20 cars are fitted with it and in daily use, and others are being fitted as fast as convenient.

To Bridge the Delaware at Philadelphia

The Camden & Philadelphia Bridge Co. has been organized to carry out the project of a bridge or two bridges across the Delaware from Market street, Philadelphia, to Market street, Camden. This proposition will undoubtedly be seriously opposed by all the wharf owners above Market street as a serious obstacle to navigation, for either of the proposed bridges would be considerably below the Reading railroad wharves, Cramp shipyard and the excursion steamer landing.

Locomotives on the Italian Mediterranean Railroad.

The working of all but a small portion of the Italian railroads on the mainland is now entrusted to two great companies, the Mediterranean and the Adriatic, respectively taking the west and the east of the Peninsula divided longitudinally. In future all the shops of the Mediterranean system will be restricted to repairs and the building of the first example of each new type of stock, all other being left by private contract. The Westinghouse continuous brake is generally adopted. Wheels and axles are obtained from Westphalia, and tires from Sheffield; but springs are now made in Italy.

As the Mediterranean system absorbed the Alta Italia and other lines, taking over their stock, the Superintendent of Motive Power and Rolling Stock, Commendatore Fresco, found about 40 different types of locomotives, which he is gradually reducing to six, viz, two each of passenger, freight and switching engines, for easy and heavy gradients. To these are being added two new types for the "bumble bug," or combined freight and passenger train, which it is found necessary to adopt to a considerable extent, and a new express engine, making altogether 9 types. The Engineer begins a series of illustrations of these principal types by a freight engine. This locomotive has all its six wheels coupled, 4 ft. 4 in. in diameter; and the outside cylinders are 18 x 26 in. The wheel base is only 11 ft., while the total length of the engine is about 38 ft. 6 in.

Bellite.

This is the name adopted for a new explosive of high power composed of dinitro-benzole and nitrate of ammonia, invented by Mr. Carl Lamm, an engineering chemist of Sweden. It has been adopted by the Swedish government for war purposes, and is now being put on the market for industrial uses. The ingredients are mixed and heated, and while still warm, moulded into cartridges which on cooling become solid and, it is claimed, non-hygroscopic. The other claims for it are that it cannot be exploded by shock, pressure, friction or contact with flame, and absence from noxious gases after combustion. All of these claims except absence from noxious gases are, it may be observed, made for dynamite. It is further claimed that though the strength of bellite is greater than that of dynamite, its action is not so instantaneous, and it is therefore a better explosive both for war and industrial purposes. Our English exchanges contain accounts of experiments intended to show both its safety and its power. First a weight of 1,120 lbs. was dropped from a height of 20 ft. on to a package of bellite cartridges laid on an iron plate. The cartridges were merely crushed. Three 3-in. cartridges stripped of their paper wrappings were placed in one pound of gunpowder and the powder fired, breaking and scattering the cartridges, but not exploding or igniting them. A cartridge was then fired on the top of a box containing cartridges. The cover was only half an inch thick, and the cartridges were exploded. Another box with a cover 1/2 in. thick was broken and the cartridges scattered about. Part of a cartridge was placed in a smith's fire, where it melted without blazing; a detonating cap exploded the rest of the cartridge. Charges of equal weights of bellite and dynamite fired on 1/2 in. boiler plates and tamped with a handful of clay, showed that though about the same amount of work was done by both explosives, the work done by bellite was slower in its action and more distributed. Further comparative experiments were made on double-headed 70-lb. steel rails laid on their sides with 2 to 4 oz. charges of both bellite and dynamite exploded on the web, each tamped with clay. With 4 oz. of bellite 22 in. of the rail were destroyed, with dynamite 18 in. of the rail were broken into smaller fragments than with the bellite. Using 3 oz. of each, unconfined, the dynamite broke through the web of the rail, while the bellite produced an extended bulge. Some rather inconclusive experiments, as far as explosive effect is concerned, were made in an iron mine, where black powder was being used, but it is asserted that though in every case where the shot had been fired the parties viewing the experiments had hurried back to the place, no smell of noxious gases could be detected, and no flame was seen. If this absence of flame is certain the explosive will prove very valuable in fiery mines.

Driver Brake Suits.

The Westinghouse Air Brake Co. has brought suit against the Eames Vacuum Brake Co. and N. W. Howson and Albert P. Massey, of Watertown, N. Y., for infringing the locomotive driver brake patent dated July, 1888, by Geo. H. Poor and transferred to the American Brake Company, now leased to the Westinghouse Company. The Westinghouse Company asks for a temporary and permanent injunction against the Eames Company, so far as this particular brake is concerned, and also prays for an assessment of damages of about \$30,000 in all. The complaint has been filed in the United States Court in Utica, N. Y., Geo. H. Christy, of Pittsburgh, and Albert Blair, of St. Louis, being counsel for the petitioners.

THE SCRAP HEAP.

An Elephantine Story.

While a circus train was standing on the track at Chestertown, Md., a locomotive halted opposite the car in which the elephants were confined. Six of the elephants thereupon thrust their trunks into the water tank on the locomotive's tender, and in a few minutes had drained it dry.—Exchange.

The Paris Exposition.

The French Minister of Commerce, in conjunction with Mons. G. Berger, Directeur-General of the Paris Universal Exposition of 1889, has taken measures to organize a "Retrospective Exposition of Industrial Work and Anthropological Sciences." The general classification will comprise: 1. Anthropological and Ethnographical Sciences. 2. Liberal Arts. 3. Arts and Trades. 4. Means of Transportation. 5. Military Arts. Each of these sections will display objects of all ages and all countries, which will be entered in a special catalogue of this exhibit. All persons who possess objects that would add to the value and interest of this collection,

and desire to loan them to the French Government, can obtain additional information from Somerville F. Tuck, United States Assistant Commissioner General, No. 1 Broadway, New York City. The French administration offers to pay the expenses of installation and freight on such objects as they consider worthy of exhibition.

Russian Railroads.

The total receipts of Russian railroads for the first half of 1888, amounted to 125,247,404 roubles, against 114,242,329 for the corresponding period of 1887. The number of passengers was 16,285,075, or 541,915 more than last year, but there were 88,695 fewer military passengers. 4,637,821 poods of express freights, 1,547,284,422 of ordinary freight were carried, showing gains of 344,497 and 142,422,929 poods over last year. The receipts per verst were 4,942 roubles, on 25,495 versts for the first half of this year, against an average of 4,662 roubles, on 54,508 versts for first half of 1887, the purely strategic paying the least of any. In the meantime the value of the imports and exports across the frontier shows an increase for the half year of about \$10,282,900, showing a total value of \$47,258,800, the exportations having increased by \$11,136,000 and the importations decreased by \$955,200. Raw materials, animals and manufactures exported all show an increase. In the meantime the value of the rouble has advanced from 42 to 48 cents, giving a slight check to the export of wheat, of which they had exported 4,084,067 tons, valued at \$19,867,000.

Union Station at Leavenworth.

The new union passenger station at Leavenworth, Kan., was opened Nov. 13. The tracks will be occupied as follows, counting from the station: First, Leavenworth, Topeka & Southwestern; second, Kansas City, Wyandotte & Northwestern; third, Union Pacific; fourth, Kansas Central; fifth, Rock Island; sixth, Missouri Pacific; seventh, Kansas City, St. Joseph & Council Bluffs; eighth, Chicago, St. Paul & Kansas City. It is understood that the Kansas City, St. Joseph & Council Bluffs trains will run into the city in two or three weeks, and that the C., St. P. & K. C. will run trains as soon as its line is completed. The building was begun two years ago and has been completed almost a year. It cost about \$300,000, contributed by the different roads, each taking one share and agreeing to prorate the expenses of operation. It was discovered that the Missouri Pacific was running more trains than any of the others, and that road was asked to allow the expenses to be divided according to the number of trains. This the Missouri Pacific refused to do and a long delay ensued, but at last a settlement has been reached and the depot is open. Its officers are as follows: Superintendent, James M. Allen; Train Dispatcher, Walter Ross.

French Railroad Expenditures for 1889.

The report of M. Bihault on the allowable expenditures on French railroads for new work for next year has just been laid before the Chamber of Deputies. The expenditure is apportioned as follows: Northern Railroad, 2,200,000 francs; Eastern, 21,000,000 francs; Western, 19,600,000; Paris-Lyons & Mediterranean, 23,200,000 francs; Orleans, 46,500,000 francs; Total, 126,800,000 francs. In addition, 15,200,000 francs are allowed for general expenses and interest during the time of construction, bringing the total up to 142,000,000 francs. This sum does not include the cost of additional rolling stock, but is the maximum amount to be expended in extensions either by the government or the railroad companies.

Lake Superior Iron Ore Trade.

The shipments so far reported amount to 4,142,899 tons, against 4,114,926 tons to the same time last year, showing an excess for this year of 27,973 tons. And it now seems probable that the prediction of the Marquette Mining Journal that the shipments of 1888 would exceed those of 1887 are to be verified, although few, if any, papers agreed with the Journal at the commencement of the season, as 750,000 tons of ore remained unsold on the docks last May. Now that and the shipments of this season seem to be fairly well sold, and some of the Marquette miners are receiving from parties in Ohio, proposals for their output of ore on cars until the commencement of the lake shipping season.

The Golden Gate Special.

The following important explanatory contribution is from the literary treasury of one of our Western exchanges:

A CHANGE OF NAME.

The special vestibule overland train, which is to render travel between the Missouri River and San Francisco luxurious, is not to be known as the "Oriental Limited" after all. That name is not considered explicit enough by General Passenger Agent Tebbitts of the Union Pacific. He insists that the name "Golden Gate Special" conveys to the minds of the traveling public a more definite idea of a fast train careering across the continent at a high rate of speed, bound for the Californian metropolis. "Oriental Limited," he contends, might apply to an ordinary train, even a Central Pacific crawler; whereas "Golden Gate Special," he thinks, has something distinctive about it, suggestive of rapidity, luxuriousness, salubrity and many other qualities. In consequence of Mr. Tebbitts' impassioned protest the original name has been gracefully withdrawn and "Golden Gate Special" is henceforth the formal title which will distinguish the new train.

The Switchmen's Strike at Indianapolis.

About 200 switchmen employed in the various yards in and around Indianapolis left their work on the night of Nov. 22, at 11 o'clock. They had made a demand for an advance of pay ranging from 15 to 25 cents a day, for a reduction of working hours from 12 to 10 per day, and one additional man to each crew. It is also said that they complained of being required to work every day in the month, whereas they desired to work only 26 days. None of their demands were acceded to, and it is said that the superintendents refused to meet Grand Master Sweeney, of the Switchmen's Brotherhood, who was appointed by the men as negotiator. It appears, however, that when the same demands were made several weeks ago the roads offered a considerable increase of pay, which was not accepted. The strikers were generally quite orderly, but some of them indulged in pin-pulling, and many persist in boarding engines, and in arguing with the new men put at work by the roads. Three engineers were induced by the strikers to draw their fires; another was beaten and kicked for refusing. On Saturday (24th) several of the companies in the yards of the roads were moved, and the most pressing shipments of freight were moved, road crews, station agents, clerks and others doing the work. The Ohio, Indiana & Western discharged several engineers for refusing to handle switch engines. The Pennsylvania system was the first to raise its blockade, a number of men being brought from other cities. On Tuesday considerable freight was being handled by new men and the roads seemed to have come out victorious.

The switchmen employed in the Buffalo yards of all the Vanderbilt roads recently demanded an increase of pay, together with a reduction of hours. It is said that the road granted extra pay for extra hours and the men acquiesced in this settlement.

RAILROAD LAW—NOTES OF DECISIONS.

Powers, Liabilities and Regulation of Railroads.

An Illinois statute known as the "Water Craft" act provides that all railroad companies having a terminus upon any navigable river bordering on that state shall have power to own for their own use any water craft necessary in carrying across such river any cars, etc., "provided that no right shall exist under this act to condemn any real estate for a landing for such water craft, or for any other purpose. And this act shall only apply to such railroad companies as own the landing for such water craft." The Federal Court in Illinois construing that law holds that a railroad company whose road terminated on the Ohio River at Cairo could not condemn land for an incline track and transfer ferry-boat landing, in order to connect with another railroad company.¹

In Michigan the Supreme Court holds that the statute of that state authorizing an attorney's fee of \$25 to be taxed against a railroad company in case of judgment against it in an action for injuries to stock, on account of its failure to fence its track, as required by the act, is unconstitutional and void, as being an attempt to grant special advantages to one class at the expense and to the detriment of another.²

An act of Congress of 1873 (United States Statutes at Large, 339) granted to the Denver & Rio Grande Railroad the right to take stone, timber, etc., from public lands for the construction and repair of its railroad, provided it was completed within five years from its passage; and in case of default the act was to be null and void as to the unfinished portion of the road. This act was amended to change the five years to ten. By an act of March 3, 1875, a general grant to railroads was made similar to the special grant of the act of 1873, except that it limited the right to material to that necessary for the construction alone.

The Federal Circuit Court in Colorado holds that the Denver & Rio Grande is entitled to the privilege of both acts; and that timber can be taken from the entire line for the construction of any portion of the line provided for in the original organization; that under these acts, depot and section houses, snow sheds and fences are a part of the railroad, but no timber can be taken from the public lands for the repair of any portion of the D. & R. G. R. Co.'s track not completed before June 8, 1882, and for that portion only from the lands adjacent thereto. After a railroad line is once completed it has no right under act Cong. March 3, 1875, to take timber from the public lands to build new switches and side tracks. The Court also holds that where a railroad has the right to take timber from the public lands adjacent to its right of way, to use for purposes of construction, it can take timber so obtained to any point of the line, however distant from the place of cutting.³

In Delaware all the property of the Wilmington & Reading Railroad Co., a corporation created by the state of Delaware, except its franchises within the state of Delaware having been sold under a decree of the Circuit Court of the United States for the Eastern District of Pennsylvania, in 1876, the Delaware Legislature, on Feb. 22, 1877, passed an act incorporating the purchasers of said railroad property under the name of the Wilmington & Northern Railroad Co., and declared such new corporation to be thereby vested "with all the right, title, interest, property, possession, claim and demand * * * in and to the railroad of the Wilmington & Reading Railroad Co. and its appurtenances, and with all the rights, powers, immunities, privileges and franchises of the corporation as whose property the same was sold and which may have been granted thereto or conferred thereupon by any act or acts of Assembly whatsoever in force at time of such sale."

The Court of Errors and Appeals holds that this act did not effect a dissolution of the Wilmington & Reading corporation (which could not be accomplished in that manner), and hence did not extinguish debts owing to such corporation or judgments of record in its favor, but in respect to such debts and judgments that corporation was dormant and in capable of action; hence, held further, that such dormant corporation was incapable of conveying a judgment, entered in its favor after the execution of the said mortgage and before said sale, to said new corporation (by making it for the use of the new corporation), so as to give a right to enforce it, and that whether such judgment was a valid and subsisting judgment or not, it did not pass to the new corporation by virtue of said act of assembly, mortgage or sale and conveyance so as to give the new corporation or its transferee the right to enforce it by execution.⁴

Carriage of Goods and Injuries to Property.

In Minnesota the Supreme Court rules that no proof being offered on the subject the consignee and not the consignor of property in the hands of a carrier will be presumed the owner.⁵

In Alabama it is held by the Supreme Court that when a railroad agreed in consideration of being released from all liability except for fraud and gross negligence, to transport horses at a reduced rate, the shipper to have free passage on the train with the horses, and to care for them through the route, it is not liable for injury to the horses caused by want of proper care on the route, though it allowed the shipper to ride on its passenger train.⁶

A Colorado statute requires all actions for penalties to be commenced within one year after the offense is committed. The Federal Court in that state decides that under the statute a suit under the state law authorizing the person injured by unjust discrimination in the matter of freight charges, etc., on the part of a railroad company in that state, to recover a penalty in the amount of three times the actual damages, must be brought within one year from the time the offense was committed, and not within one year from the time the discrimination was discovered.⁷

Injuries to Passengers, Employees and Strangers.

In Minnesota the Supreme Court rules that proof of a collision between two trains, when a passenger sues for injuries caused by it, imposes on the company the burden of proving that it did not occur by reason of any failure to exercise the care and diligence required of carriers.⁸

In Minnesota the plaintiff, an apprentice in the boiler shop of the defendant company, had worked there for over two years. He had his fingers crushed in a machine of ordinary construction and in good order. The Supreme Court holds that the company is not responsible.⁹

In Alabama, a brakeman on a train while descending the ladder on the side of the caboose, not in the discharge of his duty, but for some purpose of his own, was struck and injured by the supply pipe of a water-tank. He had been on the road for three months, knew of the proximity of the tank, and that there was not sufficient space for a person to pass between the pipe and the train. The Supreme Court holds that plaintiff was guilty of contributory negligence.¹⁰

In New Jersey, A was employed in the blacksmith shop of a locomotive and machine works, and, upon the direction of an officer of the company, repaired a chain which had been used in raising locomotive driving wheels to be worked on by B, employed by the works for that purpose. When repaired the chain was again furnished to and used by B for the same purpose, and B was injured by its breaking at the link which had been repaired. The Supreme Court rules that A and B were fellow-servants in a common employment.¹¹

In Colorado the plaintiff was an express messenger on defendant's train of cars; the air-brake apparatus of the coaches were of different types, and when the train was stopped and the engine detached, the brakes were not set, and the train by force of gravity, moved down a steep grade, and was thrown from the track, and plaintiff was injured; and the accident occurred through defendant's employees negligently leaving the train without setting the brakes. The Federal Court rules that this shows a good cause of action against the railroad.¹²

In Minnesota the Supreme Court hold that a servant who has been promised by the master that an incompetent and unsafe fellow-servant shall be removed, may remain for a time in the service without being conclusively chargeable, as a matter of law, with contributory negligence, even though, without such promise, he would have been so chargeable.¹³

In a Texas case, in an action by a brakeman against a railroad company for injuries alleged to have been caused by negligence of defendant's engineer, there was evidence that the engineer was careless in handling his engine, in making couplings and in running the train, and that he had been reported to the conductor for this; also that his engines habitually came into the shop out of repair, with defects that would not have occurred had he exercised proper care. The Supreme Court decides that there was sufficient evidence to support findings of the jury that the engineer was negligent, and that the company had notice of that fact, although there was testimony on the part of defendant that he was a safe and careful engineer.¹⁴

In Colorado a railroad company in operating a coal mine sank a shaft and threw out a pile of slack (on its own ground); the slack caught fire, and smothered for a long time, until the pile sank to the surface of the ground, on the top nothing appearing but lifeless ashes, but there being live coals underneath; this slack was contiguous to a town of 700 inhabitants; it was not fenced in, and no notice was posted to warn persons of the danger; plaintiff, a boy 12 years of age, and a stranger in town, being threatened by some miners, and fleeing from them, ran across the slack, supposing it to be nothing but ashes, and was severely burned. The Federal Court rules that the railroad is not responsible, it having the right to put the slack on its own ground, and the plaintiff being a mere trespasser when injured.¹⁵

In Kansas the Supreme Court rules that where a little boy of nine years old was wrongfully walking upon the track of a railroad company, and his presence was discovered in ample time to prevent his being injured, the company owed him the duty not to recklessly or wantonly run over him after his situation was perceived. In such a case the liability of the company must be measured by the conduct of its employees on the train or engine after they became aware of the boy's presence upon the track. After his presence was discovered, if the engineer recklessly or wantonly runs the train or engine upon him, without doing what he reasonably could to stop and avoid the injury, the company is liable.¹⁶

In the same state the Supreme Court holds that a person who undertakes to drive a team of horses, attached to a wagon, across a railroad crossing, immediately in front of an engine that had temporarily stopped on the crossing, making the usual noises by the escaping steam, and who knows and appreciates the danger, cannot recover for injuries inflicted by the frightened team.¹⁷

- ¹ St. L. & C. R. Co. v. Thomas, 34 Fed. Rep., 774.
- ² Lafferty v. C. & W. M. R. Co., 38 N. W. Rep., 660.
- ³ D. & R. G. R. Co. v. U. S., 34 Fed. Rep., 838.
- ⁴ W. & R. H. Co. v. Downward, 13 Cent. Rep., 284.
- ⁵ Benjamin v. Levy, 38 N. W. Rep., 702.
- ⁶ Cent. R. & Co. v. Smith, 4 South. Rep., 708.
- ⁷ Goodnose v. U. P. R. Co., 35 Fed. Rep., 35.
- ⁸ Graham v. B. C. R. & N. R. Co., 38 N. W. Rep., 812.
- ⁹ Berger v. St. P. M. & M. R. Co., 38 N. W. Rep., 814.
- ¹⁰ Wilson v. L. & N. R. Co., 4 South. Rep., 701.
- ¹¹ Rogers v. U. P. R. Co., 35 Fed. Rep., 206.
- ¹² Lyon v. U. P. R. Co., 35 Fed. Rep., 111.
- ¹³ Lyberg v. N. P. R. Co., 38 N. W. Rep., 632.
- ¹⁴ Houston & T. C. R. Co. v. Patton, 9 S. W. Rep., 175.
- ¹⁵ McDonald, U. P. R. Co., 35 Fed. Rep., 38.
- ¹⁶ Kas. Pac. R. Co. v. Whipple, 18 Pac. Rep., 730.
- ¹⁷ U. P. R. Co. v. Hutchinson, 18 Pac. Rep., 705.

General Railroad News.

MEETINGS AND ANNOUNCEMENTS.

Dividends.

Dividends on the capital stocks of railroad companies have been declared as follows:
Chicago & Northwestern, 1½ per cent. on preferred stock and 3 per cent. on common stock.

Meetings.

Meetings of the stockholders of railroad companies will be held as follows:

Arkansas & Gulf, special meeting, Arkansas City, Ark., Dec. 1.

Denison & Washita Valley, special meeting, Denison, Tex., Dec. 1.

East Tennessee, Virginia & Georgia, special meeting Knoxville, Tenn., Dec. 22, to consider the approval of the lease to the Richmond & Danville.

Fort Worth & Denver City, annual meeting, Fort Worth, Tex., Dec. 11.

Lehigh & Hudson, annual meeting, 161 Broadway, New York City, Dec. 3.

New York & New England, annual meeting, Boston Mass., Dec. 11.

Norwood & Montreal, annual meeting, 96 Broadway, New York, Dec. 28.

Pittsburgh & Connellsville, annual meeting, Pittsburgh, Pa., Dec. 3.

Richmond & Danville, annual meeting, Richmond, Va., Dec. 5.

Richmond & West Point Terminal Railway & Warehouse Co., annual meeting, Richmond, Va., Dec. 11.

Rome, Watertown & Ogdensburg, annual meeting, 96 Broadway, New York, Dec. 28.

Rome, Watertown & Ogdensburg Terminal, annual meeting, 96 Broadway, New York, Dec. 28.

Syracuse, Phoenix & Oswego, annual meeting, 96 Broadway, New York, Dec. 28.

Railroad and Technical Conventions.

Meetings and conventions of railroad associations and technical societies will be held as follows:

The American Association of Railway Chemists will hold its next meeting in Baltimore, Md., Jan. 14, 15 and 16.

The New England Railroad Club meets at its rooms in the Boston & Albany passenger station, Boston, on the second Wednesday of each month.

The Western Railway Club meets the third Tuesday in each month in the Phoenix Building, Chicago.

The New York Railroad Club meets at its rooms, 113 Liberty street, New York City, at 7:30 p. m., on the third Thursday in each month.

The Central Railway Club meets at the Tift House, Buffalo, the fourth Wednesday of January, March, May, August and October.

The American Society of Civil Engineers holds its regular

meetings on the first and third Wednesday in each month at the House of the Society, 127 East Twenty-third street New York.

The Boston Society of Civil Engineers holds its regular meetings at its rooms in the Boston & Albany station, Boston, at 7:30 p. m. on the third Wednesday in each month.

The Western Society of Engineers holds its regular meetings at its hall, No. 67 Washington street, Chicago, at 7:30 p. m., on the first Tuesday in each month.

The Engineers' Club of St. Louis holds regular meetings in St. Louis on the first and third Wednesdays in each month.

The Engineers' Club of Philadelphia holds regular meetings at the house of the Club, 1,123 Gerard street, Philadelphia.

The Engineers' Society of Western Pennsylvania holds regular meetings on the third Tuesday in each month, at Pittsburgh, Pa.

The Engineers' Club of Kansas City meets at Kansas City, Mo., on the first Monday in each month.

The Civil Engineers' Society of St. Paul meets at St. Paul, Minn., on the first Monday in each month.

The Montana Society of Civil Engineers meets at Helena, Mont., at 7:30 p. m. on the third Saturday in each month.

Boston Society of Civil Engineers.

A regular meeting was held Nov. 21, 82 members and 32 visitors being present. Messrs. Frank A. McInnes, J. Parker Snow and J. Frank Williams were elected members of the society. The Secretary was requested to tender to Mr. James T. Furber, General Manager Boston & Maine Railroad, the thanks of the Society for courtesies received on the occasion of the visit to Newburyport. Mr. F. O. Whitney, for the committee to prepare a memoir of Colonel F. Walling, submitted its report, which was read and accepted. The Secretary read a communication from Mr. James D. Mason, describing the tunnel recently constructed in Milwaukee for pumping the water of the lake into the river for flushing purposes. Mr. Alphonse Fleury gave a very interesting description of the Croton Aqueduct, illustrated by lantern views.

Engineers' Club of Philadelphia.

A regular meeting was held Nov. 17, 1888.

The Secretary presented, for Mr. A. H. Storrs, a description of Moore's endless rope hoist for shafts.

This system of hoisting is said to be particularly applicable to shafts of great depth. The advantages claimed are that it enables smaller engines to do the work, and effects a saving, as against the ordinary engines with drums, of about 50 per cent. in the first cost of the plant, and greatly decreases the running expenses, owing to the much smaller steam consumption; the ropes, working altogether in straight lines, should be longer lived, and work out hoisting ropes can be used for tail ropes; the cages run with less oscillation, the length of the rope is easily adjusted, and there is decreased danger of overwinding.

The plant as put in at the Neilson Colliery of J. Langdon & Co. consists of a pair of 28 x 60 in. horizontal engines with a pair of wood-faced rope sheaves and brake wheels, all 14 ft. in diameter, placed on the crank shaft. In addition to the regular brake for controlling the engines, an extra brake is provided with which the engineer can clamp the hoisting rope into the grooves of the engine sheaves in case of an emergency, such as the breaking of a rope. The tower head sheaves are 12 ft. in diameter. The transfer sheave is wrought spoke wheel about 16 ft. in diameter, so set that it can be moved towards, or away from, the engine sheaves, thus adjusting the length of the rope, and its position is always such that the line of pull of the ropes are tangents both to itself and to the engine sheaves, thus avoiding any side wear on the grooves or rope. The total hoist is about 1,330 ft. The cages weigh three tons each and an empty car about 1½ tons. The cars carry from 2½ to 3 tons of coal or rock. The cages, cars and ropes being perfectly balanced, the load in the car and the friction of the machinery is all that the engines have to overcome, and, as this load is constant all through the hoists, a steadier engine speed is obtained than with drums.

Mr. J. E. Codman presented a paper on Indicator Cards from Compound Engines, showing expansion through high and low pressure cylinders, profusely illustrated by large copies of diagrams, etc.

Mr. A. Marichal discussed the Plans of the Quaker Bridge Dam as proposed by the Board of Experts appointed by the New York Aqueduct Commission, and made comparisons between them and the plans presented by himself to the Commission at the beginning of this year. Mr. Marichal says that the report of the Board of Experts contains certain errors of such a nature as to make it almost worthless; that this report represents his plans to be built on a straight line, while four pages out of seven of the pamphlet accompanying his plan are devoted to demonstrating that the dam should be built on a curve. He, moreover, says that he was one of the first to criticize the straight line in plan. The author of the paper went into a mathematical demonstration, having for object to prove that the calculations made by the Board of Experts to ascertain the leverage, the frictional and the granular stability of the profile were based on wrong theory; and that his profile, built on a curve of 900 ft. radius, would make a much stronger dam than the one proposed by the Board of Experts, and that the cost would be less than half a million dollars.

Engineers' Club of St. Louis.

The 295th meeting of this club was the celebration of the twentieth anniversary of its formation. After the banquet the secretary read the programme for the coming year, which was published in the Railroad Gazette of last week. Applications for membership were announced and referred to the executive committee, and after this business there were various toasts, as follows: The Engineers' Club of St. Louis, responded to by T. A. Myerson; the Engineering Profession, response by Robert Moore; the City of St. Louis, response by E. D. Myer; the Engineering of the Past, response by R. E. McMath. Prof. Engler called the attention of the club to a movement in favor of a monument for Captain Eads, and suggested that the club take the lead in the matter.

The 296th meeting was held Nov. 21, thirty-one members and two visitors being present. The following new members were elected: Grant Beebe, Edmund Hall, William S. Love, William J. McNulty, R. L. Van Sant and Arthur T. Woods. Mr. Robert Moore read the paper of the evening, on Smoke Prevention. He treated the subject very thoroughly. He showed that no saving need be expected, but that experiments demonstrated a loss of 40 per cent. in boiler capacity when making no smoke. Most smokeless fuels cost too much as compared with coal. The fuel promising the best results at reasonable cost is petroleum, but the increased cost of insurance and the odor were disadvantages. Good results might be secured from that class of smoke preventers which introduced air above the grates by means of steam jets if injury to boilers can be prevented. In discussion Mr. Bryan mentioned furnaces at the Mississippi Glass Co. fed by gas producers where very high evaporative efficiency was reported. Mr. Holman stated that serious injury to boilers had resulted from the use of steam or air jets, and he had

refused to allow such devices to be applied to the water-works boilers. The general opinion of the club was that little could be expected in the way of improvement in this matter.

New England Railroad Club.

The subject for discussion at the December meeting of the New England Railroad Club will be, "Arrangement of shops and machinery for the construction and repair of rolling stock."

New England Water-Works Association.

The regular quarterly meeting of this association will be held at Young's Hotel, Boston, on Wednesday, Dec. 12. Members of Water Boards are cordially invited to be present. Applications for membership can be presented to the Secretary, R. C. R. Coggeshall, of New Bedford, Mass.

The following is the programme: Meeting of the Executive Committee, general business meeting, lunch; reading of papers, as follows: "Construction and Management of Water-Works," Hon. Chester W. Kingsley, Cambridge, Mass.; "What is the Safe Ratio of Pumping Capacity to Maximum Consumption?" W. B. Sherman, C. E., Providence, R. I.; "Water in Some of its Higher Relations," Rev. D. N. Beach, Cambridge, Mass.

Western Railway Club.

At the meeting of Nov. 20 the following subjects were suggested for discussion at next meeting: "Relative merits of thick and thin tire, and the extent to which the railroads are moving to adopt the Master Mechanics' standard centre and tire," "Water circulation and purification of water," and the "size of exhaust nozzles."

PERSONAL.

—T. Appleton has resigned his position as Principal Assistant Engineer of the Chicago, Milwaukee & St. Paul, and has been elected Secretary of the Elastic Nut Co., of Milwaukee, Wis.

—George D. Wadley, Superintendent of Construction on the Mexican Central, has been appointed Superintendent of the Owensboro & Nashville division of the Louisville & Nashville, vice E. H. Mann, transferred.

—E. A. Holbrook, General Passenger Agent of the Chicago, Rock Island & Pacific, has tendered his resignation, to take effect Dec. 1. He goes to San Francisco to become the General Agent of the Chicago & Northwestern at that point, vice H. P. Stanwood, deceased.

ELECTIONS AND APPOINTMENTS.

Annisson & Montgomery.—The incorporators are: John B. Reese, F. D. Willett, Jr., W. S. Larned, F. M. Haight, William Noble, C. C. Wrenshall, James B. Goodwin and John W. Noble, of Anniston, Ala., and John A. Goll, of Baltimore.

Aspen Short Line.—The incorporators of this Colorado company are: H. T. Rogers, Charles E. Noble, Charles E. Harris, Jr., Robert C. Hotson and E. F. Draper.

Atlanta & Alabama.—G. E. O'Keefe is Secretary and Treasurer of this company and W. H. Harrison is Acting Chief Engineer. The general office is in Atlanta, Ga.

Atlantic & Danville.—Charles B. Peck has been chosen Vice-President in addition to his duties as General Manager.

Cairo & Tennessee River.—At a meeting of the stockholders held at Mayfield, Ky., last week, the following board of directors was elected: B. A. Neale, L. Anderson, J. L. Dismukes, Hunter Wood, W. W. Robertson, J. F. McElrath and H. H. Abernathy. The directors elected B. A. Neale, President; L. Anderson, Secretary, and J. L. Dismukes, Treasurer.

Chicago, Belt & Elevated.—The incorporators of this company are Wm. P. Henneberry, Thomas Connelly and Edward C. Crane.

Chicago & Northwestern.—John E. Bunt, Resident Engineer of the Winona & St. Peter and Dakota Central divisions, has entered upon his duties as Chief Engineer, succeeding H. G. Burt, promoted.

Cincinnati, Georgetown & Portsmouth.—At the recent annual meeting the following board of directors was elected: Orland Smith, M. E. Ingalls, W. W. Peabody, James McDonald, E. W. Kittredge, W. E. Brachman. The officers elected are: President, Ralph Peters; Vice-President and General Manager, R. G. Roelker; Secretary and Treasurer, E. W. White; Superintendent, Thomas Taggart.

Columbus & Eastern.—A. J. Ball has been appointed Master Mechanic, W. H. Mautz has been appointed General Foreman of bridges and structures, and W. Brown has been appointed Supervisor of Track, all having headquarters at Redfield, Ohio.

Duluth, Red Wing & Southern.—At the recent annual meeting in Red Wing, Minn., the following directors were elected: F. W. Hoyt, L. F. Hubbard, S. B. Foote, T. B. Sheldon, Dr. G. H. Crary, of Red Wing; W. C. Rice, of Zumbrota, Minn.; M. J. Toher, C. E. Sheldon, of Owatonna; R. S. Munger, of Duluth; M. J. Todd, of Albert Lea; A. T. Stebbins, of Rochester; J. W. Park, of Balsam Lake, Wis.; G. N. Chenock, Dr. Wm. H. Tinford and C. R. Morse. The directors elected the following officers: President, F. W. Hoyt; Vice-President, S. B. Foote; Secretary, Dr. G. H. Crary; Treasurer, T. B. Sheldon.

Indianapolis, Decatur & Springfield.—The annual meeting of the stockholders of the company was held in Indianapolis, Nov. 22. R. B. F. Pierce was elected a Trustee for the first mortgage bonds, in place of John J. Crane, deceased. The following directors, to serve three years were re-elected: Stephen H. Thayer and Thomas B. Atkins, of New York; John K. Warren, of Decatur, Ill. At a meeting of the directors afterward, H. B. Hammond, of New York, was re-elected President of the company, and Thomas B. Atkins, of New York, Secretary and Treasurer.

Los Angeles & Pacific.—N. B. Brown, of Concordia, Kan., and W. B. Nisbet, Thomas J. Rusk, T. J. Cuddy and J. Marion Brooks, of Los Angeles, Cal., are the names of the projectors of this new California road.

Louisville & Nashville.—George D. Wadley has been appointed Superintendent of the Owensboro & Nashville, vice E. H. Mann, transferred.

W. G. Sala, Assistant Superintendent of the South & North Division, has been transferred to the position of Assistant Superintendent of the Knoxville branch. W. M. Newbold, Assistant Superintendent of the St. Louis & Henderson division, succeeds him.

Minneapolis, St. Paul & Northwestern.—The first board of directors will be composed of C. C. Garland, B. Warner Taylor, Carmen N. Smith, F. D. Woodbury, of Minneapolis, and Thomas Bohlen, John C. White and William G. Ward, of Waseca.

Missouri, Kansas & Texas.—E. D. Spencer has been appointed Northern Passenger Agent, with headquarters at Chicago.

John J. Redmond has been appointed Freight Claim Agent, in charge of Claim Department of the road at Sedalia, Mo.

Missouri Pacific.—W. M. Rhett has been appointed Assistant General Freight Agent, with headquarters at Memphis, Tenn.

Mobile & Montgomery.—The stockholders of the company held their annual meeting in Montgomery, Ala., Nov. 24, and the following board of directors were elected: Josiah Morris, W. H. Smith, A. M. Quarrier, Thomas G. Jones, J. F. Whitfield, B. C. Epperson, Theodore Welch, G. W. Craik and A. C. Danner. The directors elected Josiah Morris, President; A. C. Danner, Vice-President, and J. H. Ellis, Secretary.

Monadnock.—The stockholders of the road met in Peterboro, N. H., Nov. 20, and elected the old board of directors, with Dr. John H. Cutler as Clerk and Treasurer.

Natchez, Jackson & Columbus.—At a meeting of the directors of this company, held in New York city, Nov. 8, T. J. Nicholl was elected President, vice Jos. W. Drexel, deceased; G. H. Candee was elected Vice-President, vice T. J. Nicholl, promoted, and Benjamin Strong was elected Secretary. Judge Jesse L. L'Amereaux, of New York, was elected director, vice R. L. Bogle, of Raymond, Miss., deceased.

New York, Lake Erie & Western.—The annual meeting of the company was held in New York, Nov. 27. The former directors were re-elected unanimously. President John King voted on 297,500 shares of stock and \$7,292,000 bonds, and the Mills-McCullough committee appointed to receive proxies voted on 349,650 shares of stock and \$23,050,700 bonds. The scattering votes carried the total up to about \$96,000,000, an amount that never before was reached. The directors elected are: John King, John G. McCullough, Ogden Mills, J. Lowber Welsh, William White, William A. Wheelock, Henry H. Cook, George W. Quintard, William Libbey, Cortlandt Parker, Morris K. Jesup, James J. Goodwin, William L. Strong, William N. Gilchrist, Josiah Belden, M. F. Reynolds and S. M. Felton, Jr. The two last named were chosen since the previous annual election to fill vacancies caused by death.

Old Colony.—The annual meeting of the company was held at Boston, Nov. 27, and the old board of directors was re-elected.

Omaha Demurrage Bureau.—A. A. Jones has been appointed Commissioner, vice E. E. Hill, who has gone to Denver to take charge of the bureau in that city.

Oregon Railway & Navigation Co.—Edward Cookingham has been appointed Assistant to the General Manager, with headquarters at Portland, Or.

Philadelphia & Reading.—Wellington Bertolet has been appointed Assistant Superintendent of the Mahanoy Division of the road, with headquarters at Shamokin, Pa.

B. H. Ball has been promoted from the position of Division Freight to that of Assistant General Freight Agent, to take effect Dec. 1.

Prescott & Arizona Central.—The annual meeting was held last week in Prescott, Ariz., and directors were elected as follows: Thomas S. Bullock, W. E. Hazeltine, W. N. Kelly, T. J. Butler, Levi Bashford, H. C. Nutt, George O. Manchester, J. J. Fisher, of St. Louis, and W. C. Hazeltine, of Albuquerque. The following officer were elected: Thos. S. Bullock, President; W. N. Kelly, Secretary, and W. E. Hazeltine, Treasurer.

Sea View.—At the annual meeting of the stockholders of this Long Island company, on Nov. 20, the old board of directors were re-elected. The directors re-elected F. A. Schroeder, President; I. M. Bow, Treasurer, and J. L. Morrow, Secretary and Superintendent.

Seattle & Northern.—Among the incorporators of this company are Elijah Smith and W. H. Holcomb, Vice-President of the Union Pacific.

Shenandoah Valley.—At the annual meeting held in Staunton, Va., Samuel Spencer was re-elected President, together with the old board of directors.

Southern Pacific.—The following changes in the limits of the divisions on the Atlantic System between Lafayette, La., and El Paso, Tex., are announced, to take effect Dec. 1.

That part of the El Paso Division between Sanderson and Del Rio, and that part of the San Antonio Division between San Antonio and Del Rio, including the Eagle Pass branch, will be known as the San Antonio Division, with Warren Murray as Superintendent, with headquarters at San Antonio. The western limit of this division will be Sanderson, and the eastern limit will be San Antonio.

That part of the San Antonio Division between San Antonio and Glidden, including the Gonzales branch, and that part of the Louisiana Division between Houston and Glidden, including the Harrisburg and La Grange branches, will be known as the Houston Division, with J. T. McQueeney as Superintendent, with headquarters at San Antonio. The Eastern limit of this division will be the Buffalo Bayou Bridge.

That part of the Louisiana Division included between the west end of Buffalo Bayou bridge, and Lafayette, La., including the Sabine & East Texas road, will be known as the Louisiana Division, with W. B. Mulvey as Superintendent, with headquarters at Houston, vice J. S. Dunlay, resigned.

South & North Alabama.—The stockholders of the company held their annual meeting in Montgomery, Ala., Nov. 24, and elected the following board of directors: Josiah Morris, J. W. Durr, M. P. LeGrand, W. L. Chambers, E. B. Joseph, J. T. Millner, F. M. Billing, J. C. Orr, Bolling Hall, M. E. Pratt, W. R. Pryor, H. F. DeBardeleben and M. H. Smith. The directors elected the officers of the company as follows: H. F. DeBardeleben, President; M. H. Smith, Vice-President and H. M. Bush, Secretary.

Tavares, Orlando & Atlantic.—The office of General Freight and Passenger Agent of the road has been merged with that of General Manager, T. M. McKennan assuming the duties of both offices under the title of General Manager, with G. H. Hepburn as Assistant General Freight and Passenger Agent.

Texas & Northwestern.—The incorporators of the company are: R. H. Sellers, R. A. Rogers, J. P. Moore, W. H. Lawrence and E. O. Varley, of Fort Worth; Schuyler Lawrence, of Sealy; H. Lee Sellers, of Galveston; Louis O. Smith, of Kansas City; E. A. Morse, of Rutland, Vt., and A. W. Moore, of Plattville, Wis.

Union Pacific.—W. H. Knight, late of the Wabash Western, has been appointed General Agent at Chicago, in place of J. M. Bechtel.

T. M. Orr has been appointed Assistant to General Manager Kimball, and will transact business for that officer in absence of the Assistant General Manager.

OLD AND NEW ROADS.

New Companies Organized.—Anniston & Montgomery.—Chicago Belt & Elevated.—Los Angeles & Eastern.—Midville, Swainsboro & Red Bluff.—Minneapolis, St. Paul & Northwestern.—Scranton & Forest City.—Seattle & Northern.—Texas Northwestern.

Alabama & Georgia.—A bill to incorporate this company with a capital stock of \$500,000, to build a road from the Georgia state line to Centre, with George P. Smith, Robert R. Savage and others as incorporators, has been introduced in the Alabama Legislature, as has also been a bill to incorporate the Guntersville, Fort Valley & Chattanooga Valley Railroad Company.

Anniston & Montgomery.—A bill incorporating the company has been introduced in the Georgia legislature. The terminals of the road will be in Montgomery and Anniston, and branches are to be built from points on the line between these cities. The capital stock is placed at \$2,000,000.

A bill incorporating the Fairmont & Augusta road has also been introduced in the legislature.

Astoria & South Coast.—The contract for clearing and grading the first section from Astoria, Or., has been let, and work is now in progress on the contract. Tracklaying will soon commence. When the road is completed to the Seaside House, 18 miles south of Astoria, the extension toward Tillamook Bay will be commenced. E. Lund & Co. are the contractors for clearing the right of way at \$175 an acre, the clearing to be 60 ft. wide.

Atlantic, Atlanta & Great Western.—The preliminary surveys for this road are still in progress between Atlanta, Eatonton and Savannah, Ga., and it is expected that they will be finished in December. A bill will be introduced in the legislature this week to lease the Western & Atlantic road to the Atlanta, Atlantic & Great Western Railroad Navigation Co. The two lines would give a competing line of road from Chattanooga, Tenn., to Savannah. This bill provides for a lease of the Western & Atlantic road for the term of 50 years at a minimum sum equal to six per cent. per annum upon the value of the property as appraised by a commission, to be appointed by the Governor of the state, or in lieu of six per cent. 25 per cent. of the gross income of the railroad property, the rental to be paid monthly. The bill provides that the lessee company shall give bond to the amount of \$1,000,000.

Augusta & Chattanooga.—The suit of W. B. Lowe & Co., contractors, of Atlanta, against this road for work done in grading, was settled last week by the payment of \$16,000 by the directors, who gave a mortgage secured by sixty-day notes. The company has about 20 miles of road completed from Augusta, Ga., toward Chattanooga, Tenn., to which it was proposed to build. It is reported that the charter of the company will be transferred to the Cincinnati Southern, to give that company a line to the seaboard.

Cairo, Vincennes & Chicago.—The charter will soon be granted to John McNulta, Receiver; K. H. Wade, General Superintendent; William Hensil, Chief Engineer; G. W. Stevens, Division Superintendent; J. M. Osborn, General Freight Agent of the Wabash, and M. A. McDonald, General Manager of this road, which extends from Danville to Cairo, 261 miles, for the construction of a new line, 64 miles long, from Danville to Strawn, or some point near there, on the Chicago Division of the Wabash. The principal object of the new line is to shorten the distance between the Indiana and Illinois coal fields and Chicago. It will make a new Chicago and Cairo route but 11 miles longer than via the Chicago & Eastern Illinois. Preliminary surveys are now being made.

Canadian Pacific.—The adjourned meeting of the shareholders was held last week at Montreal to consider the lease of the Detroit extension of the Ontario & Quebec. It was voted unanimously to confirm the lease whereby the road will obtain an entrance into Detroit by building from London to Windsor, and thence by ferry to Detroit. President Van Horne submitted correspondence with the Grand Trunk concerning a trackage lease between London, Ont., and the Detroit River, from which it appears that the Grand Trunk was approached on the subject three times with fruitless results. Mr. Van Horne stated that the real cause of the failure of the last negotiations was a new condition imposed by the Grand Trunk, requiring the Canadian Pacific to discontinue the carriage of its freight traffic between Ontario points and the Canadian Northwest by its own line via Smith's Falls, and to turn it over to the Grand Trunk for carriage between Toronto and Northbay on terms which he pronounced unreasonable and absurd. He pointed out that the connection with the Michigan Central was rendered valueless through its control by the New York Central & Hudson River. Mr. Van Horne also pointed out that the Ontario & Quebec and the other eastern lines controlled by the Canadian Pacific were practically debarred from participation in the heavy freight and passenger traffic between the Western and New England states, and from much other valuable business; and now that the eastern connections of the company were well established, the immediate completion of the Detroit extension seemed to be an absolute necessity. It is stated that the Canadian Pacific will run trains into Chicago over the Wabash tracks, and will have terminal facilities in Chicago in connection with that system.

Cedar Falls & Sioux City.—In the suit of Morris K. Jesup and others, Trustees of the Cedar Falls & Minnesota Co., against the Illinois Central, the Cedar Falls & Minnesota, and the Dubuque & Sioux City, Judge Blodgett decided this week that the Dubuque & Sioux City Co. must submit itself to the jurisdiction of the Court by the first Monday in February or the suit would be dismissed. The road has never been brought into court, and the Illinois Central moved to have it subjected to the jurisdiction of the Federal Court or dismiss the bill of complaint. Judge Blodgett decided that the road was an indispensable party to the suit, and entered the above order.

Chesapeake & Ohio.—A called meeting of the stockholders of the company was held in Richmond, Va., last week and the plan of reorganization of the company, adopted last February, and the act of the Virginia Legislature authorizing it, so far as the interests of the state were concerned, were adopted. The plan of reorganization involves the issue of new bonds for outstanding stock amounting to 36,229 shares.

The board of directors was instructed to take steps for the execution of a deed of trust to secure \$30,000,000 of bonds to be issued in furtherance of the reorganization scheme.

Chicago & Atlantic.—There is the greatest activity in all the departments of the road, says a local paper, preparatory to a large increase in business. At the shops of the company in Huntington many car loads of lumber have been received, which will be utilized in the construction of 150 gondola and platform cars, the work on which will begin immediately. Ten new caboose cars have been ordered from the Peninsular Car Works, of Detroit, and will be delivered next month. Four new mogul locomotives are about to be received from the Brooks Works, for

freight service, and in January four heavy passenger engines will be received from the same works. In addition to this new equipment many old cars are being rebuilt and prepared for active service. An increased force will be put on, and the shops run to their utmost capacity. During the past season nearly five miles of new siding has been laid at different points on the line where it was most needed, and a new yard constructed at Hammond, with capacity for 1,200 cars, and the yard at Fifty-first street in Chicago has been enlarged to the same capacity. The company is also constructing a 20 stall brick round house at Hammond, and will make that point the end of its freight division, running its freight cars into Chicago by yard trains, regular crews for which business will be stationed at Hammond.

Chicago Belt and Elevated.—Charter filed in Illinois, with a capital stock of \$7,000,000, to build a road in and through the towns of Worth, Calumet, Lake, the city of Chicago, Lake View and Waukegan.

Chicago, Dayton & Cincinnati.—The company has had several lines surveyed, the most favorable being from Huntington, via Bluffton and Geneva, to Versailles, O., a distance of 65 miles. The maximum grade is 26 ft. per mile, and there will be but little excavation. The right of way has not yet been secured, but \$200,000 in local aid has been voted to the company. It is thought that the contract will be let next spring. George G. Pride is Chief Engineer, and L. P. Milligan is President of the company, both with office at Huntington, Ind.

Chicago & Eastern Illinois.—The work of double-tracking the road between Moline and Chicago, a distance of 50 miles, is progressing well and will be completed this year.

Chicago & Northwestern.—It is reported that a survey is being made from Freeport to the Mississippi River, via Yellow Creek, Willow, Pleasant Valley, Derinda and Hanover, Ill., to Bellevue, Ia., directly opposite Galena, Ill., and it is thought that the survey is for a proposed line between these points, as mentioned in these columns last week.

Chicago, St. Paul, Minneapolis & Omaha.—The General Land Commissioner has decided that a tract of about 6,000 acres of land in the Ashland (Wis.) land district, claimed by this company, is not mineral in character, and consequently passes to the railroad company under its grant. These lands were approved for patent by the Secretary of the Interior Dec. 13, 1887, but the issue of patent was suspended pending investigation as to the character of the lands, it having been alleged that they were mineral, and therefore not subject to the grant.

Cincinnati, Hamilton & Dayton.—The company has filed a petition against W. R. McKean to rescind the purchase of a large amount of railroad stock bought by H. S. Ives while president. The stock was of the Terre Haute & Indianapolis Co. Ives gave notes for a deferred payment and secured them with the stock. Failing to pay the notes, McKean sold the stock and secured the full amount. The plaintiff alleges that Ives' purchase of the stock was void, he having no right to purchase railroad stock of a road lying in Indiana.

Colima & Manzanillo.—The Mexican National Construction Co. is grading that portion of the line in Colima lying between the City of Colima and the port of Manzanillo. Work was begun at Colima. F. Greene is the engineer in charge.

Denison & Washita Valley.—It is stated that the bonds for this road have been placed in the East, and that the building of the road from Denison, Tex., to the coal fields near Lehigh, in the Indian Territory, is assured. The locating survey for the line is now in progress.

Denver & Rio Grande.—The surveying party has been working on the location of a tunnel through Tennessee Pass, between Leadville and Red Cliff, Col., and has made a survey which, it is believed, will be approved by the officers of the company, and acted upon at an early day. Should the work in question be executed, it will greatly reduce the grade of the road, and make it one of the most economical routes between Aspen and Glenwood and Denver.

Downington & Lancaster.—Ground was broken on Nov. 27 at New Holland for the extension of the road, which will connect with the main line at Bird-in-Hand. The road, which was known under the old charter as East Brandywine & Waynesburg, was reorganized last summer.

East Tennessee, Virginia & Georgia.—At Knoxville, Tenn., on Nov. 24, in the case of the minority stockholders who filed a bill to enjoin the majority from making a lease to the Richmond & West Point Terminal Co. and the Richmond & Danville system, and also to appoint a receiver, Chancellor Gibson granted an injunction restraining this company from approving the lease in any way or at any meeting, and also granted an order preventing the Richmond & Danville from operating the road under the lease or assuming any contract by virtue thereof. The motion for a receiver was denied, upon condition that the company in good faith reassume control of its property; but if this was not done, or if complainants could show that there was any collusion, whenever the same was brought to his attention the Chancellor would appoint a receiver.

Eutawville.—The contract for building a 15-mile section on the extension between Brocton and Sumter, S. C., will soon be let. Surveys for a further extension from Sumter north to Cheraw on the Seaboard & Roanoke will also soon be made. I. W. Fowler, of Eutawville, S. C., General Manager.

Jackson & Middleton.—Col. James Hamilton, General Manager of the Gulf & Ship Island, has placed surveyors in the field locating a line between Jackson, Tenn., and Middleton, Tenn., the present terminus of the Gulf road. A charter authorizing the construction of the line is held by citizens of Jackson, and it is stated that the work is to be completed within 18 months, the line to be under control of the Gulf & Ship Island Co.

Kansas City, Fort Smith & Southern.—The grading on this road is now completed from Neosho, Mo., to the Jasper County line, and tracklaying is in progress. It is expected that trains will be running to Neosho by Jan. 1.

Los Angeles & Pacific.—The company has applied to the County Board of Supervisors at Los Angeles, Cal., for a franchise for a road from the Arroyo Seco to a point in the northern or western boundary line of the county. The road will run along the Arroyo Seco to the Tejuja, and then run up the Tejuja Cañon and to the plains to the east of Summit Station, on the Southern Pacific, between Acton and Alpine. A branch will then connect with the Southern Pacific at the summit.

Louisville, St. Louis & Texas.—Tracklaying has been completed over the entire length of the road between Louisville and Henderson, Ky., and the road will be opened for traffic within ten days.

Louisville Southern.—Two routes in Madison County, Ky., for the Richmond, Nicholasville, Irvine & Beattyville extension have been surveyed, and the specifications and drawings have been submitted by the engineers and the line decided upon. Ground will be broken for grading in a week or two in Madison County, and the work will be pushed as fast as possible in order to take advantage of good weather. Engineers are now at work in Jessamine County also, and progressing favorably.

Maysville & Big Sandy.—General Passenger Agent G. Housell announces that this road will be opened for freight and passenger traffic over its entire length Dec. 3.

Memphis & Atlantic.—Early this year citizens of Memphis, Tenn., were asked to subscribe \$100,000 to this road, then called the Memphis, Oxford & Columbus. Several efforts have been made to have the amount subscribed, but so far unsuccessfully. A committee has now been appointed to endeavor to collect the amount, and it is thought with a fair prospect of success.

Memphis, Little Rock & Indian Territory.—The surveying corps is pushing westward from Hot Springs, Ark., to the Indian Territory as rapidly as possible. Work is also in progress on the line between Hot Springs and Little Rock, and considerable grading has been completed, notwithstanding unfavorable weather. The Missouri Pacific has made no formal move towards building the Benton branch of the St. Louis, Iron Mountain & Southern, but is considering the feasibility of entering Hot Springs on a route which will not immediately parallel this line.

Midville, Swainsboro & Red Bluff.—This company has been chartered in Georgia for the purpose of building a road from Midville to Red Bluff. The incorporators are: James W. Burch, Albert G. Sherman and Wm. L. Gregg, of Augusta, Ga.

Minneapolis, St. Paul & Southwestern.—The company has filed a charter in Minnesota with a capital stock of \$15,000,000, with the same amount as a limit of liability and indebtedness. The proposed road is to be almost an air line between Minneapolis and Kansas City, Mo., reducing the distance between the two cities 125 miles, and opening a new tract of land in Southern Minnesota, Iowa and Missouri. The line runs through Des Moines.

Missouri, Kansas & Texas.—Application was made this week by Judge Brewer, of the United States Circuit Court, at Topeka, Kan., by E. Ellery Anderson, attorney for the company, for an extension of the jurisdiction of the receivers to control the stocks, bonds and other property owned by the company. The Missouri Pacific entered a protest against the extension of the power of the receivers. The application was granted, however, and the receivers were given jurisdiction over the Missouri, Kansas & Texas interest in 97,284 shares of the capital stock of the International & Great Northern, 10,000 shares of the capital stock of the Galveston, Houston & Henderson, and all other property, valued at about \$1,500,000. This order gives the receivers direct control of the International & Great Northern.

The supplementary auxiliary bill of the Mercantile Trust Co., of New York, trustees, complainants, against the Missouri, Kansas & Texas and Missouri Pacific companies, defendants, was argued before Judge Pardee, in the Circuit Court at Waco, Tex., this week. Judge Pardee, after hearing arguments, filed his order, taking ancillary jurisdiction and confirming the receivership, and the action heretofore taken by Judge Brewer, of Kansas.

Mobile, Jackson & Kansas City.—A bill to ratify the consolidation of the Mobile, Hattiesburg & Jackson companies of Alabama and Mississippi under this name, and to confer franchises upon said consolidated company, has been proposed in the Alabama Legislature.

Natchitoches.—It is stated that the company has received an offer from Eastern capitalists to furnish funds for extending the road to Shreveport from Natchitoches, La., as was originally proposed.

New Roads.—A charter is to be obtained for building a road from Hiawatha via Baker and Willis to Harlan, Kan. It is stated that the Missouri Pacific will be interested in the enterprise.

Northern Pacific.—The Secretary of the Interior has denied the application of the company for authority to construct a short branch line through the Puyallup Indian Reservation in Washington Territory. The Secretary holds that the Department has no authority to grant the right of way sought, and that the former grant for the existing line of the company through Puyallup reservation, made by the Indians and approved by the Department of the Interior, was without authority of law. Congress alone has the power to authorize the construction of a railroad through the Indian Reservation.

Ohio & Northwestern.—The company will soon commence tracklaying on the extension from Portsmouth to Gallipolis, O. The company has made arrangements for entering Cincinnati over the narrow gauge Cincinnati, Lebanon & Northern, by laying a third rail from Indlewild Junction.

Old Colony.—At the annual meeting of the company, held in Boston this week, a resolution authorizing the directors to construct the branch from North Attleboro to Walpole, Mass., at a cost of from \$250,000 to \$350,000 was adopted. The surveys for the line are now being made. A motion was adopted authorizing the company to increase its capital stock from \$2,000,000 to \$15,000,000.

Omaha, Dodge City & Southern.—The company has proposed to build the line through Osborne County, providing \$20,000 in bonds is voted by the city of Osborne, and \$54,000 by the six townships of the county. The Board of Trade of the city will appoint a committee to endeavor to raise the necessary amount. The road is projected to extend from Dodge City, Kan., to Superior, Kan., a distance of 200 miles. About 30 miles of the road have been completed.

The company is now engaged in a final survey of the route from Dodge City north to Osborne. Bonds have already been voted in Ness County, and the Commissioners of Ford County will soon call an election. It is also expected that propositions will be submitted in Osborn and Ellis counties within the next 30 days, and in Jewell County as soon as practicable. The route north of Osborne is via Mankato to Superior, Neb., which will be the eastern terminus of the road.

Pennsylvania, Slatington & New England.—The application of counsel for William V. McCracken, Receiver of the company, for the approval of the Receiver's final account, and his formal discharge, was heard this week in the United States Circuit Court at Philadelphia. Counsel for the purchaser of the road agreed to the proceeding, and the judge directed that the formal decree, taking the road out of the hands of the Receiver, and granting the latter his final discharge, should be recorded.

Portland & Vancouver.—Trains are now running from East Portland, Ore., to the Columbia River, opposite Vancouver, W. T., 8 miles. The long trestle out into the Columbia River is nearly completed.

Port Royal & Augusta.—A writ of injunction, praying that a Receiver be appointed for this road, which is controlled by the Central of Georgia, has been filed in the Superior Court at Augusta, Ga., before Judge Roney by T. P. Branch, H. B. Kinz and others, stockholders of the road. They set forth that under the Central's control the road is not run to subserve the best interests of the stockholders, and that the management is acting ultra vires, inasmuch as a special provision in the Central of Georgia's charter forbids its controlling competing lines, and this the Central does, as both its own and the Port Royal & Augusta's lines run from Augusta to the coast.

Richmond & Chesapeake.—The contractors, J. C. Carpenter & Co., have resumed work on the tunnel at Richmond, Va., and it is expected that it will be completed by the time specified in the city ordinance. The suspension of work was caused by some difficulty between the construction company and the contractors.

Rio Grande & Utah.—President John W. Conley, of Chicago, and several directors are now at Albuquerque, N. M., in consultation with the Chief Engineer, V. D. Simar, of Durango, Col., and this has given rise to a rumor that some action will be taken in regard to the early construction of the road. The line has already been surveyed from Algodones N. M., to Durango, Col., 200 miles. It connects at Algodones with the Atchison, Topeka & Santa Fe, some of whose stockholders are interested in this road.

Rochester & Glen Haven.—The grading on the road between Glen Haven and Irondequoit Bay, N. Y., is making rapid progress and will soon be completed. The line is already constructed between Rochester and Glen Haven.

St. Paul, Minneapolis & Manitoba.—The branch of the road from Crookston to Forston, which is nearly completed, was opened for business last week.

San Antonio & Aransas Pass.—About \$75,000 has been subscribed for the subsidy to secure the extension from Comfort to Llano, Tex., by residents along the line of the proposed extension, and now an effort is being made to secure an equal amount in San Antonio.

San Domingo.—It is reported that the government has granted a valuable concession to Ogden P. Fell and C. V. Sidell, of New York City, for the construction of a railroad from San Domingo City to the city of Azua, about 100 miles. A subsidy is promised of \$2,000 per mile in cash, besides a large land grant.

Scioto Valley.—Three suits have been begun in the Common Pleas Court, at Columbus, O., against the company. They are based upon promissory notes of the aggregate face value of about \$147,493, and are brought in the name of C. P. Huntington and Edward F. Winslow, of New York. Mr. Huntington, it is understood, owns a controlling interest in the line, and it has been operated in connection with the Chesapeake & Ohio to reach tidewater. The present litigation, it is rumored, will result in Mr. Huntington taking control of the road. The first case is for \$10,000 salary in favor of William Adams Adonis as President of the road from 1880 to 1883. The plaintiff in the second case is C. P. Huntington, for the collection of four promissory notes of \$25,000 each, which were originally issued to F. H. Davis, of New York, and later assigned, and the third plaintiff is E. F. Winslow, whose claim is based on six promissory notes aggregating \$50,000.

Scranton & Forest City.—A charter has been granted by the Secretary of State of Pennsylvania to this company to build a road 22 miles long. The capital stock is \$220,000.

Seattle & Northern.—Articles of incorporation have been filed in Washington Territory to build a line from Seattle north via Whatcom to Blaine, near the British Columbia line; also several branch lines in the territory. The capital stock is placed at \$5,000,000.

Southern Pacific.—On the extension south from Templeton, Cal., about 1,400 men are at work, and nearly 10 miles have been already completed. The Stockton & Tulare is being rapidly finished and will soon reach Poso, the end of the line.

South Mountain.—The sheriff was announced to sell at Lebanon, Pa. on Nov. 27, the franchise and property of the road. Some railroad men gathered, but there was such a disagreement that the entire matter was postponed until Nov. 30. James Marsh, of Lebanon, the execution creditor, refused to accede to the sale on the ground that his interests would be prejudiced. Mr. Marsh is a contractor, and has a bill against the railroad for grading. The South Mountain was chartered in 1854, and a large amount spent in grading and other work. It has been sold by sheriffs several times. The last time it was purchased by Senator Gobin. The road is chartered to extend from near Poughkeepsie to Slatington, Pa. There are three claimants to the franchise of the road, each alleging ownership under a different sale, viz.: The Philadelphia & Reading, the Harrisburg & Eastern and General Gobin, of Lebanon.

South Norfolk.—A writ has been served on the company for \$50,000 expended in grading the Port Rowan & Lake Shore road, which has been taken over by the South Norfolk Co.

Tennessee & Coosa.—A bill has been proposed in the Alabama Legislature to declare the lands granted to the company by the general assembly of Alabama, by act approved Jan. 20, 1858, forfeited, and to require the Governor of Alabama to take such steps as may be necessary to recover possession of the same; also to authorize the Governor of Alabama to foreclose the mortgage to the State of Alabama made by the railroad company.

Tennessee & Ohio.—It is reported that the road extending from Rogersville Junction, on the East Tennessee, Virginia & Georgia, to Rogersville, 16 miles, will be extended to Big Stone Gap, Va., 45 miles. Preliminary surveys have been made.

Texas & Northwestern.—Charter filed in Texas to build a road from Dallas to Fort Worth, and thence to a point on the northwestern boundary line of Texas, and thence toward Albuquerque, N. M., 500 miles northwest from Fort Worth, with a branch from the main line toward White Oaks, N. M. The line laid down in the charter is as follows: "Through the counties of Tarrant, Parker or Wise, Jack, Young, Archer or Baylor, Throckmorton, Stonewall, Crosby, Lubbock, Torrey, Yoakum, Swisher, Lamb and Bailey, or a portion of any or all of them as may be determined by actual surveys." The capital stock is placed at \$500,000, and the principal office is to be in Fort Worth.

Versailles & Midway.—Tracklaying on the extension from Midway to Georgetown, Ky., 10 miles, has been

finished to near the Elkhorn River, and will probably be completed to Georgetown by Dec. 1. It is expected to have the road opened to regular traffic between Versailles and Georgetown by Dec. 15.

Wabash, St. Louis & Pacific.—The two masters have commenced taking testimony in New York City, which must precede the granting of a decree of foreclosure. It is proposed to carry the proceedings through as fast as possible and have the question of the foreclosure decree settled. It is understood that a number of the dissenting bondholders will be cited to appear before the masters as witnesses. Some of these bondholders have deposited some of their bonds under the plan, but are still opposing its terms.

Winona & Southwestern.—The road was formally opened Nov. 23 by an excursion over the first 25 miles, tendered by President William Windom and other officials to business men and representatives of the press. The road is projected to extend between Winona and Omaha.

TRAFFIC AND EARNINGS.

The Inter-state Commerce Commission.

The Commission has issued a memorandum upon the subject of relative rates on oil in barrels and oil in tanks. In August last the Pennsylvania issued a circular stating that the rates on refined oil, etc., would be adjusted "in accordance with the directions of the Inter-state Commerce Commission," so that the weight of barrels would be charged for the future in addition to the weight of the oil, and rates on oil in barrels were accordingly raised. Inquiry showed that the change was made in pursuance with what was understood to be the effect of the ruling of the Commission in the case of Rice vs. the Louisville & Nashville. The Commission now states that it has made no ruling that oil properly be so construed. The transportation of oil to Eastern points was proved in the Rice case to be very different, in respect of back loading and of hazard, from its transportation to Southwestern and Western points. The decision was rendered upon the facts before the Commission; it had exclusive reference to the facts complained of, and was not intended as a general ruling affecting all parts of the country. In case the entire subject had been before the Commission, with proper parties, and it had been called upon to establish a general rule of classification upon the subject, it might have adopted the practice previously in use upon the Pennsylvania road, or some compromise upon that system and the one recommended for use upon the Southern roads. However this might be, the decision showed its own limitations, and the use made of it was a misconception of the terms. This, however, involves no question of good faith on the part of the Pennsylvania road.

The Commission, by Commissioner Walker, has rendered a decision in the case of Slater against the Northern Pacific, which states that:

"A complaint made for the purpose of retaliation for a fancied wrong, so as to get even with a carrier for the revocation of complainant's pass, does not commend itself to the Commission. A carrier which has conformed to the ruling of the Commission should not be prosecuted for alleged violations of law in that respect which have occurred before such ruling was made and under a construction of the law then approved by the carrier's counsel.

"Free transportation issued in the form of an annual pass to a person not in the regular and stated service of the carrier nor receiving any wages or salary under a contract of employment, but requested by him as compensation for throwing in its way what business he conveniently could, is held to be illegal."

Traffic Notes.

The Chicago, Rock Island & Pacific, which has just opened its Colorado line for passenger traffic, has made an excursion rate of \$10 from Denver to Missouri River points. The other roads immediately announced similar rates.

The Chicago, Milwaukee & St. Paul has reduced second class fares between Chicago and St. Paul to \$7. This action is on account of the large quantity of mileage and other irregular tickets placed in the hands of outside agents by certain lines, by means of which rates have been constantly cut. It is said this road has also reduced fares from Chicago to the Missouri River.

Ten passengers publish a card in a Western paper, asserting that a sleeping car advertised to run between prominent Western cities, over two roads, has missed its connection five times within the last two weeks, causing a delay in reaching destination of about eight hours. It is asserted that a quarrel between the roads is the cause of this poor service.

It is said that Southern pine is now sold at such low prices in the West and Southwest that the market for Northern pine is seriously impaired, and that the traffic of the roads between Chicago and the Southwest in this lumber has been permanently diminished to a serious extent.

Movements are in progress to institute demurrage bureaus at Council Bluffs, Kansas City, Salt Lake City, Cheyenne, Columbus, O., St. Paul and other places.

National Association of Baggage Agents.

The Eighth Annual Convention will be held in San Francisco Cal., on the third Wednesday in January. Application for membership may be forwarded to the secretary, J. E. Quick, Detroit, Mich.

Accommodations for members and their families have been secured at the Baldwin Hotel. Rooms and board, \$3 per day; inside rooms and board, \$2.25 per day. It was only after mature deliberation and consultation with superior officers that it was finally decided to hold a meeting on the Pacific Coast, and this is the best time for such a meeting. Recent arrangements for interchange of baggage business between the transcontinental and eastern lines make it very desirable that the general baggage agents of all such lines meet together for better acquaintance and exchange of ideas as to best and most expeditious manner of transacting the transcontinental checking, and adopting uniform modes of checking, tracing, etc. The recent adoption of the "Transcontinental Excess Ticket," and collection of through excess, adds to the importance of holding this meeting at the Coast. Everything will be done to make the expense of the trip as light as possible.

It is important that every member notify the Secretary not later than Dec. 10 as to his intention regarding attending, as the Committee must have 30 days' notice of names of all who will attend, that transportation over Pacific lines may be arranged and sent out.

The committee appointed relative to the subject of transportation of dead bodies is meeting with great encouragement in its work. The great importance of this work is being recognized by the press and all associations interested in sanitary measures, and the committee are receiving letters from such associations promising them all aid necessary in the adoption of a uniform and successful system, and it is desired that all members come fully prepared to act on this matter.

The review and revival of the constitution and by-laws will be brought before this meeting, and it is requested that each member carefully read them and be prepared with suggestions.

gestions. The system of C. O. D. collections now in force, and other important subjects, are also to come before the meeting. Members will please send in their list of foreign unclaimed baggage, as prescribed by resolution adopted at St. Paul meeting.

Meaning of Terms Used on Way Bills.

The Chicago committee of the Central Traffic Association has decided that all way-bills for freight for which actual weights are obtained at Chicago, shall be stamped with or have written upon them "Actual weight." In case of grain or other property weighed under the direction of the Board of Trade Inspector, and for which the certificate of the inspector is given, the way-bills shall be stamped "Board of Trade certificate weight." In the case of grain delivered from elevators, weight not certified to by the Board of Trade Inspector, and for which the railroad company has not obtained the actual weight, the notation on way bill shall read "elevator weight." In the case of grain or other property coming through from the West, not transferred or reweighed at Chicago, the way bills shall bear notation, "Western Railroads' Weight."

Southwestern Rates.

The numerous detailed rumors concerning conferences between the Missouri Pacific, Atchison, Topeka & Santa Fe, St. Louis & San Francisco and other southwestern roads, which have been published during the last fortnight, still lack confirmation. Rates in that territory are not extremely low, except, perhaps, on certain kinds of traffic, and the motive for radical action by the presidents of the roads is not very clear. Commissioner J. W. Midgley, of Chicago, has been in New York in conference with presidents, but he seems to cast discredit upon most of the newspaper reports. A Chicago paper prints the following abstract of a form of agreement said to have been drawn up at the conferences alluded to:

PROPOSED AGREEMENT.

The agreement is to embrace all roads between points west of a line drawn through Chicago and Milwaukee on the east, St. Paul and Minneapolis on the north, Colorado, New Mexico and Wyoming on the west, and Arkansas on the south.

All the existing freight and passenger associations within the territory named are to be abolished and merged in the new Trust, or Clearing-house, as it is named. There is to be an executive board of three, which shall devote its entire attention to the affairs of the Clearing-house, and be entrusted with all matters connected therewith. One of the three is to be elected Chairman of the Clearing-house, and the other two to be known as vice-chairman of the freight department and vice-chairman of the passenger department, respectively.

The objects of the association will be:

(A.) To secure complete reports of all competitive traffic carried by either of the parties hereto in the territory named.

(B.) To prescribe the rates, rules, and regulations which shall govern in the conduct of the passenger and freight traffic as aforesaid, and insure their strict maintenance by all members.

(C.) To prescribe the character of the service and the conveniences which shall be offered the traveling and shipping public.

The rates, rules and regulations shall be established by a board of managers consisting of one accredited representative from each company member of the Clearing-house. In case the members fail to agree upon any question brought before the Clearing-house, it shall be referred to the executive board mentioned above.

The authority to make rates, rules or regulations to apply in any traffic subject to the Clearing-house carried by either road party thereto, or to change or depart from the same when established, shall be taken from the officers of the several railroads as such and be vested absolutely in the Clearing-house.

The divisions of all through rates on business included in the agreement shall be arranged through the Clearing-house, the intention being that the bidding for business by means of private concessions shall cease, and that the divisions in corresponding traffic, under similar circumstance as to receipt and delivery, shall be open to and alike via all lines.

One officer of each road party to the Clearing-house shall be held responsible for the strict maintenance by his road of all rates and rules established by the Clearing-house; and he shall not be at liberty to depart therefrom unless by authority of the Executive Board.

In order to satisfy themselves that the full agreed rates, as established by the Clearing-house, have been charged and in no case rebated or refunded, the Auditor of the Clearing-house and those whom he shall appoint shall have authority to check the various station accounts, the receivers and forwarding books; also all books, accounts and vouchers kept in the auditor's or comptroller's office of each road member of the Clearing-house. With the view of still further providing for an accurate exhibit of the affairs of each road, the officers making reports to the Clearing-house shall certify to their correctness; and in case irregularities are charged, or the accuracy of the answer made by any road is questioned, the officer believed to be familiar with the transactions may be examined under oath by the Executive Board.

It is provided that for violations of the rules of the Clearing-house a penalty shall be assessed of not less than \$250 for each offense. Should, however, the circumstances be aggravated, or considerable freight thereby have been secured, the convicted party shall be required to forfeit an amount equal to the revenue which shall have been collected on the entire lot thus contracted. The sum forfeited shall be divided among the other members concerned. In the event that any member is convicted of having violated the rules, or has willfully deducted the established rates, then the facts connected therewith, together with the conclusion reached, should be certified by the Executive Board to the President of the company concerned, and in case the Executive Board shall recommend the removing of the offending officer or agent he shall be dismissed from the service of the said company.

The Executive Board shall be empowered to secure to each member such share of the business for which it can legitimately compete as they may conclude it is entitled to receive.

The contract, when made, shall be signed by the chief executive officer of each company, the intention being, if practicable, in order to make it more solemn and binding, that it shall be approved by the Board of Directors or the Executive Committee of each company.

Cotton.

The cotton movement for the week ending Nov. 23 is reported as follows, in bales:

Interior markets:	1888.	1887.	Inc. or Dec. P. c.
Receipts.....	159,723	189,372	D. 29,650 15.7
Shipments.....	132,759	164,738	D. 31,979 18.8
Stock.....	263,443	409,428	D. 125,985 30.8
Seaports:	1888.	1887.	Inc. or Dec. P. c.
Receipts.....	266,292	249,388	I. 16,904 6.8
Shipments.....	193,027	165,942	I. 27,085 15.7
Stock.....	741,598	855,663	I. 114,065 13.3

Coal.

The coal and coke tonnage of the Pennsylvania originating on lines east of Pittsburgh and Erie for the week ending Nov. 17, and the year to that date, was as follows:

	Coal.	Coke.	Total.
Total for week ending Nov. 17.....	249,820	100,291	350,111
Total for year 1888 to date.....	10,250,196	3,555,585	13,805,781
Total for year 1887 to date.....	9,071,380	3,218,530	12,289,910

The anthracite coal tonnage of the Belvidere division of the United Railroads of New Jersey division for the same periods was as follows:

	1888.	1887.	Inc.
Total for week.....	38,381	20,048	18,333
Total for year.....	1,474,330	1,359,454	114,876

The coal tonnages for the week ending Nov. 24 are reported as follows, in tons:

	1888.	1887.	Increase.	P. c.
Anthracite.....	831,269	737,031	144,238	19.5
Bituminous.....	362,664	346,435	16,229	4.7

Railroad Earnings.

MEMPHIS & CHARLESTON.

Year to June 30:	1888.	1887.	
Gross earnings.....	\$1,759,731	\$1,606,771	
Oper. expenses and taxes.....	1,259,974	1,195,491	
Net earnings.....	\$499,757	\$411,280	
Other income.....	794	8,259	
Total income.....	\$500,551	\$419,539	
Interest.....	397,372	395,507	
Surplus.....	\$103,179	\$24,032	
Other payments.....		4,000	
Surplus.....	\$103,179	\$20,032	
Gross per mile.....	5.332	4.869	
Net per mile.....	1.662	1.382	

ALLEGHENY VALLEY.

Month of October:	1888.	1887.	I.	D.
Gross earnings.....	\$202,468	\$192,679	I.	\$9,789
Oper. expenses.....	98,190	100,643	D.	2,452
Net earnings.....	\$104,278	\$92,037	I.	\$12,241
Ten months to Oct. 31:				
Gross earnings.....	\$1,718,153	\$1,676,230	I.	\$41,923
Oper. expenses.....	992,454	1,029,537	D.	37,083
Net earnings.....	\$725,699	\$646,693	I.	\$79,006

NORTHERN CENTRAL.

Month of October:	1888.	1887.	I.	D.
Gross earnings.....	\$586,846	\$501,294	I.	\$85,552
Oper. expenses.....	378,727	444,902	D.	66,175
Net earnings.....	\$208,119	\$56,391	I.	\$151,728
Ten months to Oct. 31:				
Gross earnings.....	\$5,215,743	\$5,180,483	I.	\$35,260
Oper. expenses.....	3,521,392	3,398,986	I.	122,406
Net earnings.....	\$1,694,440	\$1,781,496	D.	\$87,056

Earnings of railroad lines for various periods are reported as follows:

Month of October:	1888.	1887.	Inc. or Dec. P. c.
Det., Bay C. & Alp.....	\$38,487	\$38,201	I. .286 .8
Net.....	13,724	11,792	I. 1,932 16.4
Mexican Central.....	445,914	444,216	I. 1,698 3.8
Net.....	207,614	178,210	I. 29,404 16.5
W. Va. Cent. & Pitts.....	70,337	49,385	I. 20,952 42.7
Net.....	18,593	16,640	I. 1,953 11.8
Ten Months—Jan. 1 to Oct. 31:			
Det., Bay C. & Alp.....	395,121	404,573	D. 9,452 2.3
Net.....	146,171	179,556	D. 33,385 18.8
Mexican Central.....	4,613,017	3,878,435	I. 734,582 18.9
Net.....	1,780,127	1,676,593	I. 103,534 6.2
W. Va. Cent. & Pitts.....	535,707	318,941	I. 216,766 6.8
Net.....	167,575	106,870	I. 60,705 56.8
Month of September:			
Central Pacific.....	1,438,173	1,325,237	I. 112,936 8.5
Net.....	616,065	640,234	D. 24,169 3.8
Cin., Ind., St. L. & C.....	286,118	255,283	I. 30,835 12.1
Net.....	92,325	101,937	D. 9,612 9.4
Denver & Rio Grande.....	721,272	753,551	D. 32,279 4.3
Net.....	301,257	336,779	D. 35,522 10.5
East Tenn., Va. & G.....	466,628	504,481	D. 37,853 7.5
Net.....	152,594	191,057	D. 38,463 25.1
Knoxville & Ohio.....	44,671	41,029	I. 3,642 8.9
Net.....	18,471	14,745	I. 3,726 25.3
New Brunswick.....	86,238	81,407	I. 4,831 5.9
Net.....	35,908	32,011	I. 3,897 12.1
Southern Pacific:			
North. Div. (Cal.).....	210,830	157,040	I. 53,790 34.3
Net.....	113,283	70,708	I. 42,575 60.2
South. Div. (Cal.).....	553,162	256,059	I. 297,103 116.0
Net.....	157,392	29,183	I. 128,199 43.8
Arizona Division.....	146,074	123,173	I. 22,901 18.6
Net.....	19,885	36,149	D. 16,264 45.1
New Mexico Div.....	69,723	55,703	I. 14,020 25.2
Net.....	23,564	25,200	D. 1,636 6.8
Nine Months—Jan. 1 to Sept. 30:			
Central Pacific.....	11,660,230	9,809,429	I. 1,850,801 18.9
Net.....	4,768,480	4,663,920	I. 104,560 2.2
Cin., Ind., St. L. & C.....	1,966,689	1,992,832	D. 26,143 1.3
Net.....	726,931	774,079	D. 47,148 6.1
Denver & Rio Grande.....	6,653,993	5,721,292	I. 932,701 16.3
Net.....	1,830,394	2,347,048	D. 516,654 22.0
East Tenn., Va. & G.....	4,049,690	3,755,349	I. 294,341 7.8
Net.....	1,362,366	1,029,883	I. 332,483 32.3
Knoxville & Ohio.....	361,794	333,407	I. 28,387 8.6
Net.....	150,053	102,867	I. 47,186 45.8
New Brunswick.....	642,642	500,129	I. 142,513 28.7
Net.....	211,410	243,309	D. 31,899 15.1
Southern Pacific:			
North. Div. (Cal.).....	1,523,906	1,284,620	I. 239,286 18.6
Net.....	693,778	590,531	I. 103,247 17.5
South. Div. (Cal.).....	4,995,971	2,934,204	I. 2,061,767 70.2
Net.....	1,230,668	949,212	I. 281,456 29.6
Arizona Division.....	1,594,141	1,209,491	I. 384,650 31.8
Net.....	296,925	510,010	D. 213,085 41.8
New Mexico Div.....	756,122	540,478	I. 215,644 39.9
Net.....	211,410	243,309	D. 31,899 15.1

Early reports of monthly earnings are usually estimated in part, and are subject to correction by later statements.

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